VOLUME XXXVIII | Established 1914 | Number II

CHEMICAL INDUSTRIES

FEBRUARY, 1936

CHEMICAL INDUSTRIES is published monthly by Chemical Markets, Inc. WILLIAMS HAYNES, *President*; H. H. ADAMS, *Vice-President*; WILLIAM F. GEORGE, *Secretary-Treasurer*.

Published on the tenth day of each month at New Haven, Conn., and printed for the publishers by The Tuttle, Morehouse & Taylor Company.

Entered as second class matter, December 22, 1934, at the Post Office at New Haven, Conn., under the act of March 3, 1879.

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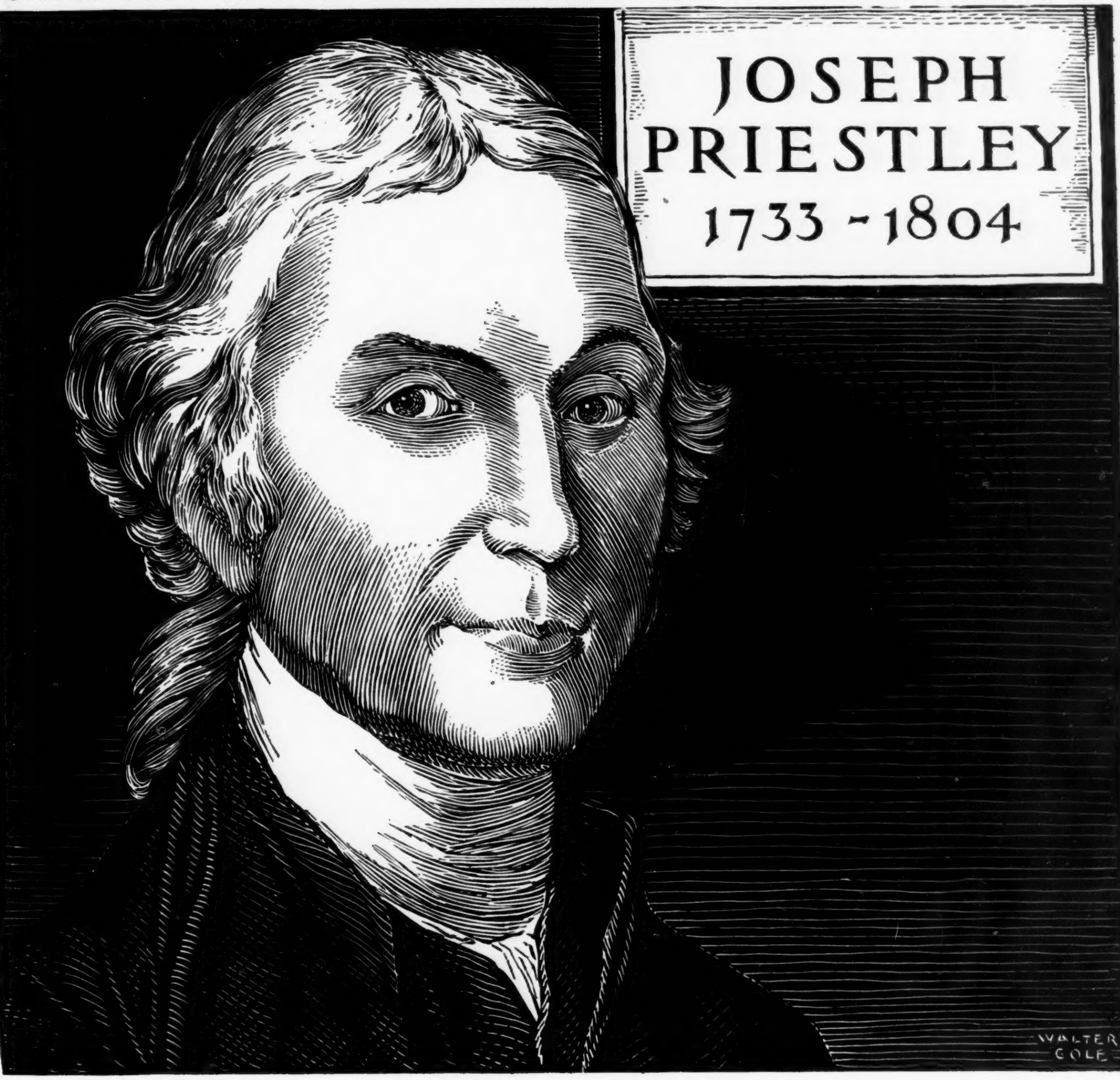
JOSEPH
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1733-1804
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The Reader Writes:—

A Progressive Reader

I am especially interested in the articles, news items and abstracts which deal with any phase of new developments leading to either the improvement of old processes or the institution of new and more efficient operations designed to increase our industrial welfare as a whole, or to make more efficient use of existing raw materials.

Indiana, Pa. SIDNEY P. ARMSBY.

It's Different in Germany

Here in Germany are five or six great chemical corporations, covering all fields, both commercial and scientific. If one does not belong to them, work is immensely difficult.

While in the U. S. A. products (particularly new products) are readily for sale, this is not the case here. The manufacturer is always afraid that an outside chemist might do something with the new product, or that eventually new fields might be discovered, which may be patentable. Consequently, the manufacturer here tries to make use of his own product in such a way that the outside chemist or laboratory cannot do anything with it.

An advertisement like the one you had in your paper about ethylenediamine, which points out just what product this is and what remarkable syntheses can be derived therefrom, is absolutely impossible in Germany (there are only a few exceptions).

Very often, large German chemical corporations do not dispose of an exceptionally favorable process for the manufacture of a substance, but carefully control the intermediate products. If the necessary materials were available to the more experienced single chemist or could be obtained by the smaller manufacturer, the big firms might not be protected after expiration of patents.

It is true that one finds new and rare materials in the catalogues of so-called dealers in laboratory chemicals—but at what price! It is impossible to undertake even semi-industrial work with these chemicals, for example, when a kilo of acetamid costs from 6 to 8 marks.

Moreover, the bigger concerns have a peculiar reaction to inquiries or proposals. Either the buyer is asked the last detail about his purchase and afterwards does not get delivery anyhow, or not the least of pains are taken to satisfy the purchaser.

I repeat the example of acetamid: I asked a price from one of the great chemical corporations: their answer consisted of several questions. What do you wish to do with the product? What quantity do you use? What quality do you require? Will you use the product yourself or resell it? I answered these questions with the result that I was advised the product could not be delivered. The chemical director of another large concern answered that acetamid was not a product with which anyone could do anything, I must have been mistaken and meant "Formamid."

Do I have to point out to you how different all this is than in the U. S. A.? In Germany, credit or capital is not of much use, because the difficulty lies first in the purchase and not with the sales. Here the usual question with the chemist is not how much does it cost, but who is delivering.

And what has CHEMICAL INDUSTRIES to do with it?

In reading your magazine, in studying the prices by following up the advertisements, I dream: How wonderful it would be to be able to do this or that if I could only work under American conditions. These chemical conditions have existed always in Germany. They have not changed with the new times.

I am sorry to say that through the German exchange difficulties, chemical imports are forbidden. But I am still getting your American journal, to keep my vision, to see the big, wide horizon, and to view the chemical possibilities. So now you know why I get your magazine—even though some of it seems very curious to us Germans, as, f.i., pictures of golf-playing chemists or chemical garden parties. But this is secondary.

Berlin, Germany. G. Z.

Chemistry *a la* Heywood Broun

Such slathers of ink have been smeared over the pages of technical journals, popular magazines and newspapers about Muscle Shoals that all chemical people must long ago have come to definite conclusions as to the chemistry, the economics, and the politics of this prize white elephant of Uncle Sam's. I hesitate, therefore, to ask for an inch even of your well filled pages (in both meanings) and yet only your chemically-minded readers can adequately appreciate the contribution made to the voluminous literature of the Shoals by Heywood Broun, and it seems a pity that this gun should remain buried in the obscurity of his column in the *New York World-Telegram*. Accordingly, I quote:

"And I am not fantastic in saying that this fight in which the foe has a field goal lead is actually the struggle between life and death. If crops are to be planted which will hold the soil, the farmer must have cheap phosphates to fertilize them. The all but idle plant at Muscle Shoals could easily produce them, but there is a legitimate fear that any such enterprise would earn the interdiction of the high court. Accordingly, if any attempt is made it will be by indirection. Perhaps the effort might be made to sneak up on the nine old men by telling them that the Muscle Shoals plant must be kept active for the purpose of national defense. It seems quite possible that the Supreme Court would sanction the manufacture of phosphates and nitrates if the suggestion were made that these were needed for the making of explosives and poison gas.

"It has been said that the T. V. A. crowd is composed of rampant radicals. Nothing could be further from the fact. The young men and the old men on the job are economic infants and political tyros. Some of them voted for Hoover. They are technicians who began with the naive notion that the right way to do a job was the best way. I think some of them may become radical. Scratch a technician hard enough and he is apt to say, 'Get out of my way, and let somebody run who can run.' "

If that is NOT fantastic then the science of chemistry is a game of mumbledepeg. We have the production of superphosphate by the good old cheap process of acidulation. We have the T. V. A. experimenting with both the blast furnace and the electric furnace methods. But phosphates by indirection—that is a new one! I have heard 1,234,567 (more or less) excuses why those $19,000,000 (more or less) worth of plants at Muscle Shoals have never produced nitrates and/or phosphates; but the perfect alibi is that "the Supreme Court won't let us."

For years I enjoyed reading Broun's light, sane comments on life and literature. If I knew as little about phosphates and the T. V. A. as I do about books and plays, I am ashamed to confess I might think this quotation a clever and comprehending piece of observation. As it is, I begin to suspect that Mr. Broun is either a smart Alec, a goofy dupe, or an utterly unscrupulous "pink." Likely, he is a little of all three. Chemistry *a la* Broun is nothing more nor less than a snappy shot of propaganda. Such perversion of the facts is either dumb or dishonest, and if any of the T. V. A. technicians have a shred of professional spirit, they will publicly rebuke such twaddle, and wash themselves clean of that sloppy coat of soft-soap.

Philadelphia, Pa. G. B. HEWITT.

CHEMICAL INDUSTRIES

VOLUME XXXVIII NUMBER 2

Chemical Control Over Farm Prices

AMID all the hullabaloo over control of agricultural prices, nobody has noticed an example of such control, exercised by supply and demand through the instrumentality of competition between land and laboratory, which within the year has been demonstrated right before our faces.

Vanilla beans, used extensively, exclusively for flavoring, grow on a vine of the orchid family, native to Mexico but widely cultivated throughout the semi-tropics. At three years, the vines reach maturity. At eight, they cease to produce profitable crops. Accordingly, young stock must be continually grown on for replacement. In 1924, a great crop shortage gave growers in Madagascar a virtual corner and they ran the price from $1 to $9 a pound. Vanilla growing was naturally stimulated all over the world. By 1927, the crop had doubled so that prices began to decline and by 1932 reached 50¢, at which figure it does not pay to harvest and cure the beans. Falling prices caused all the nice new plantations to be neglected, and in 1932 another shortage developed. But this time the famine price jumped only to $3.50.

The same forces that in 1924 stimulated an over-production of vanilla, stimulated the substitution of vanillin for the natural flavoring material. This increased consumption, plus improved technic, has enabled our vanillin makers to reduce their price from $8 in 1924 to $2.75 in 1932. The price of the synthetic having been lowered two-thirds, the famine price of the natural product could advance only to $3.50, or one-third as high as the peak of $9 of twelve years ago.

Such a tangible contribution to a cheaper, steadier price is an inspiration to our chemists and a needed bit of economic instruction to our legislators.

A Mess of Porridge

During the World War we were awakened with an unpleasant shock to the reality that our chemical dependence upon foreign countries for nitrogen, potash, and coal-tar synthetics was a deadly serious matter to important industries, to our public health, to our national defense. Today, we are chemically independent in all three, and our position in nitrogen and potash appears to be quite impregnable. But our coal-tar industry is still vulnerable to the same sort of attacks which, pre-war, had killed off several efforts to establish in this country, this vital branch of chemical activity.

It is yet too early to say just what effect the cutting in half of our coal-tar dye tariff will have. Plainly, the cheaper, big tonnage dyes will suffer most, and one suspects that it may be the Japanese dye makers who will be chief beneficiaries of the Swiss bargaining tariff. Though Germany is specifically excluded from direct advantage, few well informed dye men, either manufacturers or importers, are naive enough to believe that, with a factory in Switzerland and cartel agreements with Swiss companies, they will not in some way be able to reap a reward at our industry's expense.

To those who remember the dye famine days and the suffering caused by the lack of such coal-tar medicinals as salvarsan and barbitol; to those who labored twelve hours a day for months to create an American coal-tar industry; to those who know what dyes mean to both explosives and medicines; Secretary Hull has sold our birthright for a mess of porridge when he exchanges dyes for lard.

8,800,000 Minus What Equals 11,000,000?

Eleven million unemployed must be reabsorbed by industry before public spending for relief can be stopped. So say the Government spokesmen and the implication is made very plain that industry itself by lagging back is keeping the budget unbalanced. It is smart politics to take into the New Deal all credit for every scrap of progress towards recovery and to blame results of errors and the costs upon the Supreme Court, the bankers, and industry. But in this re-employment problem the facts are very plain.

Table 737 of the "Statistical Abstract for 1934", published under the authority of the Secretary of Commerce, shows that only one person out of sixty-seven of all the 48 million gainfully employed work in industry. Five-sixths of all our workers are in agriculture, personal and public service, trade, transportation, communication, construction, forestry, mining and fishing. Industry proper at the peak has never employed more than 8,800,000: yet industry is told bluntly to reabsorb 11,000,000—or take the consequences!

Patents That Hinder Progress

Patents based upon reactions quite obvious to any competent chemist and so obviously lacking any inventive merit, are sharply criticized by Dr. P. H. Durand in a review of the developments during the past year in the field of solvents and plasticizers, published in *The Chemical Age* (London). The British Patent Office does not seem to realize that esters and ketones of almost any type may be used as plasticizers provided they possess the necessary properties of low volatility, stability, and miscibility. He notices a number of patents issued for the mere esterification of a well known alcohol by a well known acid, and comments that the situation appears to be even worse in the United States.

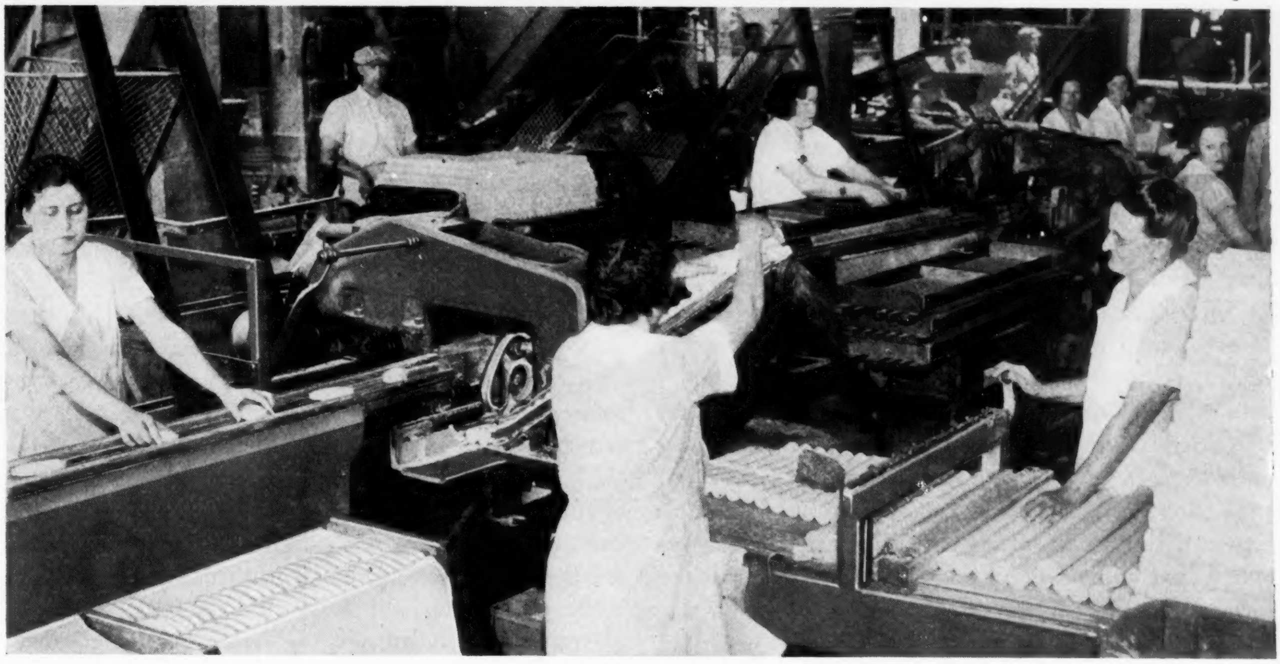
We fear that Dr. Durand is quite correct in his surmise. Such patents certainly have no protective value to the patentee. Their sole use lies in their nuisance value. Not only do they clutter up the courts, but they also hinder the natural course of technological progress in one of the most important and fastest growing branches of applied chemistry.

Naphthalene in the "Spotlight"

Coal-tar chemicals have been "stealing the show" recently in market interest. The shortage of crude naphthalene is now described as acute, and buyers of refined are genuinely worried since the active season starts in March. Germany has already placed an embargo and indications are that at least one other country abroad will follow suit. Unsettled conditions abroad plus fundamental changes in certain chemical processes are likely to lead to a world shortage.

The situation in cresylic acid is somewhat analogous. The demand from resin manufacturers is steadily increasing and the introduction of cresylic into gasoline refining has placed the limited supplies in a decidedly firm position.

Lagging improvement in steel operations (still only 50 per cent. of capacity) holds the answer at least in part to the shortage not only of naphthalene and cresylic, but also of the solvents, toluol, xylol, and solvent naphtha. The procedure of pushing the so-called consuming industries and neglecting the durable goods group is having repercussions in the balance of supply of vital industrial chemicals.



Processing Taxes in a Chemical Process Industry

By Mary Gaffney

NEW Deal legislation has created an impasse in the soap industry. Because it uses the inedible grades of many fats and oils which are also raw materials of margarine, this industry has been drawn unwillingly into conflict with the butter interests.

Butter had won several decisive victories over margarine before the depression began. In 1902, uncolored margarine was taxed one-fourth cent per pound and colored margarine ten cents per pound. Moreover, since 1931 foreign butter had carried a duty of fourteen cents per pound and foreign butter substitutes a like rate. So long as anti-margarine legislation was confined to the finished product, the soap industry was not affected.

In 1929, however, an effort was made to include a duty on the constituent oils of margarine in the Tariff Act which was finally passed in 1930. (A duty of two cents per pound on coconut oil from non-Philippine sources already existed.) Farm lobbyists appeared before the Committee on Ways and Means, asking for a 45 per cent. *ad valorem* duty on foreign vegetable oils. The soap manufacturers delegated F. M. Barnes of the American Laundry Soap Manufacturers' Association to protest against an indiscriminating *ad valorem* tariff which would penalize them as well as the margarine manufacturers. On January 9, 1929, Mr. Barnes appeared before the Committee and testified in part as follows:

> The soap industry . . . has been the real importer of vegetable oils. We have been coupled up, however, with the edible-oil industry, and on account of that the needs of the soap maker have been lost sight of . . . . The consumption of fat in the soap kettle went from 775 million pounds in 1912 to 1,650 million pounds in 1928. The production of fats available to the soap kettle in the United States . . . . amounted to 900 million pounds. In other words, we were short—absolutely short. There was nothing to take its place—750 million pounds of raw materials.
>
> The program that has been outlined here of an *ad valorem* duty of 45 per cent. would mean, approximately, an advance in the price of soap of 50 per cent., and that is a real statement of fact. There is nothing that can offset that. The soap manufacturer produces nothing in the way of raw materials. He simply is a converter. He accumulates the raw materials from the entire world. He brings them together and he produces soap, so that he is simply in the position of taking care of whatever cost is placed on his raw materials . . . . .

Mr. Barnes' argument evidently carried weight for the sub-committee considering revisions in the oils and fats schedule rejected the 45 per cent. tariff and recommended only minor changes in existing rates. The effect of the sub-committee's report persisted in House and Senate and the Tariff Act, as finally enacted, imposed a new rate of one cent per pound on edible palm-

kernel oil (leaving inedible or soap oil free), and three cents per pound on sesame oil (classed as edible and rarely used in soap), but permitted palm oil and the great bulk of the coconut oil to continue to come in free. The soapers sighed their relief and went back to their kettles.

The lull was to prove short-lived, however. When the depression fastened itself upon the country, butter men, galled by dropping prices for their product, thought they saw in the New Deal's anxiety to help the farmers, their opportunity to deliver another, possibly fatal blow to coconut oil and margarine. Flanked by cottonseed oil and fish oil interests, the dairy farmers conducted a vigorous campaign for a processing tax on foreign fats and oils on the platform that these oils were "flooding" the country and depressing to a pitiable degree the prices of all domestic fats and oils such as butter, lard, cottonseed oil, and fish oils. The American farmers would be immeasurably helped by such a tax, they said, and the demand for his products would be greatly increased if the price of the foreign oils were made prohibitive.

Revenue Act of 1934

The Revenue Act of 1934 was chosen to launch the new attack against foreign oil users. In January, the House Ways and Means Committee proposed a tax of 5 cents per pound on sesame and coconut oil. Sesame oil was then selling for 9 cents and coconut oil for 2½ cents per pound. In March, the Senate Finance Committee whittled the rate down to 3 cents per pound but included palm, palm-kernel, and sunflower seed. Soap manufacturers protested vigorously. The time-worn arguments against taxing inedible oils along with the edible were revived and Senator Copeland introduced an amendment exempting the inedible grades. This went down to defeat. Congress was still exhilarated by the dash and daring of the 1933 session; legislation was in the air and not to be denied. On May 10, 1934, the bill became law practically in the form outlined by the Senate Finance Committee. A processing tax of 3 cents per pound was levied on the first domestic processing of coconut, palm, palm-kernel, sesame and sunflowerseed oil. At the same time imported whale and fish oil, by an amendment to the Revenue Act of 1932, became subject to an import tax of 3 cents per pound. The former already bore a tariff of 6 cents per gallon or about .8 cents per pound.

For the soap manufacturer an outright 3 cents processing tax on approximately 35 per cent. of his raw materials actually confronted him with a 100 per cent. increase in his raw material costs, for the average level of soap prices in early 1934 was around 3 cents, and after the processing tax was imposed domestic tallow and greases rose rapidly until they reached a parity with the increased cost of the foreign oils. Under these circumstances the soaper did what any business man would do. He tried to find a loophole in the tax through which he could escape paying it without violating the law itself.

Before the tax went into effect some soapers hurriedly saponified their stocks of taxable oils, believing that a processing tax could not be levied on the oil in this soap, even though the soap was still in the kettles and had not been run out into frames and cut into bars. Other soapers split their stocks of taxable oils into fatty acids and glycerin. The fatty acid could be used in soap in place of oil and the glycerin could be treated as a by-product, as it usually is in soap manufacture. Fatty acids constitute over 90 per cent. of the weight of most oils.

When Regulations 48 on the processing tax were issued by the Bureau of Internal Revenue over two months after the tax went into effect, the soapers who had saponified their oil discovered that they were liable for the full tax on all the oil in their saponified stock, while those who split their oil into fatty acids and glycerin learned that the regulations permitted them to use the fatty acids in soap without paying a tax on them. Wondering at this interpretation of chemical processing, the less fortunate soapers paid the tax on their saponified material, and the entire industry began an uphill fight to raise soap prices commensurate with the increased costs of raw materials.

Since fatty acids in soap were declared non-taxable, the more alert soapers found here a possible loophole through which to avoid the tax. If a soaper imported coconut oil and split it into fatty acid and glycerin, he must pay the tax on this splitting process which is considered a "use" or a "first domestic processing" of the coconut oil. The only way in which fatty acids might serve as a loophole, then, would be to import them. There was an import duty of 10 or 20 or 25 per cent. *ad valorem*, according to whether they were classed as waste, n.s.p.f.; stearin; or fatty acids, n.e.s., and mixtures thereof. But a material saving could be effected even after paying the tariff since a 100 per cent. *ad valorem* tax could be avoided.

The exact amount of fatty acids imported since the processing tax went into effect is probably not known because of the lack of agreement as to classification among customs officials. Beginning with August, however, imports of fatty acids have been segregated in the statistics. Total imports during August-October, inclusive, were 11,264,510 pounds, of which about 45 per cent. came from the Philippine Islands. In the August 27, 1935, issue of *Meats, Livestock, Fats and Oils*, a publication of the Department of Commerce, Trade Commissioner J. Bartlett Richards of Manila reported:

> Exports of fatty acids and vegetable lard to the United States, free of oil excise tax, growing, but only one company is in position to ship fatty acids, others hesitating to make investment in equipment. Three companies are exporting vegetable lard and another considering going into production, with exports running about one thousand tons monthly each of fatty acids and coconut oil compound.

American soapers also sought relief from the processing tax through another channel—the importation of soap. Not far across the borders of Canada two or three of the large American soapers have operated plants for several years. It was not difficult to enlarge their capacity and to saponify Canadian-imported fats and oils for American trade. The Canadian tariff on coconut oil is only 10 per cent. *ad valorem*. The soaper could bring in his unfinished soap in tank cars by paying the U. S. import duty of 10 per cent. *ad valorem* on soap, package, and sell it here for less than he could manufacture the same soap in the United States and pay the processing tax on the constituent oils. During the first nine months of 1934, imports of soap averaged 325,000 pounds per month. In October, 1934, they jumped to 1,755,419 pounds and in November to 3,793,956 pounds. Practically all of this increase was in imports from Canada. A high level of imports has been maintained throughout 1935.

The soap industry, which had stood united against the dairy farmers, now sensed a division of interests among its own members. Only the larger soapers could manufacture soap in Canada and import it for sale here. Although total imports of about 30 million pounds in 1934-35 were only a little over 1 per cent. of our domestic soap production, they looked considerably larger to the small soaper who felt that he had not only been oppressively taxed by his government, but was now being betrayed by his fellows.

Relief through Legislative Channels

Importing fatty acids and soap was only a temporary expedient which could never replace profitable manufacture. Profit was hard to make, however, with taxes (including the "luxury" tax of 5 per cent. on toilet soap) costing the industry from one to two million dollars a month, according to the estimate of the Association of American Soap and Glycerine Producers, Inc. It was decided that relief should be sought through legislative channels.

On May 10, 1935, just a year after the processing tax went into effect, Congressman Dockweiler introduced a bill into the House of Representatives calling for the abolition of the processing tax on denatured coconut oil from the Philippines fit only for inedible use. Senator Bland introduced an identical bill into the Senate. A number of important newspapers endorsed these bills but Congress adjourned without taking action on them. They will be brought up again this session. Their passage will be urged on the grounds that soap is an every-day necessity which should not bear an onerous tax, that the provision for remitting the tax on Philippine coconut oil to the Philippine government is an illegal use of taxing authority, and that the tax on Philippine coconut oil is contrary to the pact in the Tydings-McDuffy Act in which we agreed that coconut oil should be allowed to come in free (up to an amount considerably in excess of our present requirements) for ten years, or until the Philippines had definitely established their independence.

Independent action has also been taken by the Iowa Soap Company who have petitioned a Federal Court for a restraining order to prevent the collection of the processing tax on coconut and palm oils. The Haskins Soap Company, moreover, has obtained an injunction from the District of Columbia Supreme Court which will bar the Secretary of the Treasury from turning over the moneys already collected from the tax on Philippine coconut oil to the Philippine government. A counter move has been made by the National Cooperative Milk Producers Federation which has announced that it will seek "an import, excise or processing tax of 5c a pound on all imported fats and oils used in the United States" as soon as Congress convenes. A possible deterrent to this objective is the agreement on the part of the United States not to increase the processing tax on palm oil, as incorporated in the recent trade pact with the Netherlands.

Meanwhile, Washington caught up with the soapers who were importing fatty acids and soap. On August 30, 1935, Congress approved the "Revenue Act of 1935" which provided (Section 402) a compensatory import tax of three cents per pound on any article manufactured or produced wholly or in chief value from coconut, palm, palm-kernel, sesame, sunflowerseed, and foreign whale and fish oils. All soap, fatty acids, glycerin, oleomargarine, lard compounds, and any other product which might contain a taxable oil became subject thirty days after enactment to an import tax on the amount of oil used in their manufacture.

This compensatory tax was received with mixed feelings by the soap industry. It meant a probable loss to those who had invested capital in soap and fatty acid plants in foreign countries, but it also abolished the special disadvantage under which the small soaper believed himself to be operating.

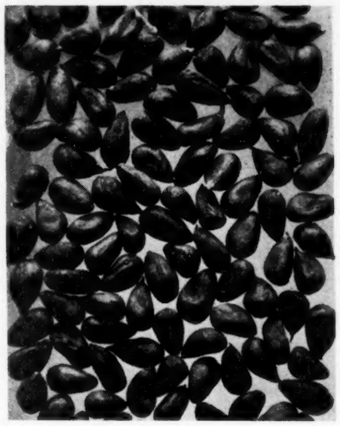
Incidentally, it appears that the Bureau of Internal Revenue will be called upon to probe the complexities of oil technology in fixing the tax rates for the various derivatives and compounds of taxable oils. For example, they have recently issued a preliminary ruling that, since about 10 pounds of oil are required to yield one pound of glycerin, the compensatory tax on imported glycerin shall be 30 cents a pound, ten times the tax on the original oil, and three times the cost of the product itself!

Sea Ooze as Rust Preventive

Experiments conducted in Germany on sea ooze or slime indicate that this material has useful possibilities as a base in the manufacture of rust preventive paint if it is made air-dry. Slime treated in this manner resists strongly the effect of oxygen on iron materials. Reported by Vice Consul C. T. Zawadski, Berlin.

Delinting Cotton Seed

A New Market for Concentrated Sulfuric Acid



By Walter J. Murphy

POSSIBLE additional consumption of thirty thousand tons of crude sulfur annually is indicated in a large scale commercial method for delinting cotton seed. In terms of concentrated acid, the process opens up a new market of over one hundred thousand tons in the South and Southwest.

The first suggestion of decorticating seed with concentrated acid appeared in two British patents, granted in 1874-1875, so that the idea is definitely a very old one. Agricultural experiment station bulletins have for years recommended to the cotton seed user treatment of the seed with acid, but almost in the same breath have warned him of the danger attending its use. The result has been that the desirable practice has been limited almost entirely to a very few progressive growers and to workers on special projects at the various experimental stations. A second deterring factor has been the high cost of acid to the farmer when bought in small quantities from local sources of supply.

The gap between the easy manipulation of the chemical laboratory and the cumbersome "tub and paddle" methods advised for treating larger quantities of seed was too wide to be bridged by the natural force of circumstances, and a practice which is readily conceivable might have literally saved millions of dollars to the cotton producer was dismissed with but scant attention.

In place of the hazardous "tub and paddle" method, J. G. Brown and others associated with the Arizona State Experimental Station have developed a continuous-process delinting, sterilizing and drying unit. As the business of operating such a plant commercially was beyond the scope of the Experiment Station, a company was formed for this purpose and is known as the Chemical Seed Treating and Delinting Corporation of Tucson, Arizona.

A flow-sheet of the process is reproduced opposite. The fuzzy seed to be treated is dumped into a seed hopper from which it is fed continuously into an inclined treating trough (unit 1); concentrated acid (93 or 98 per cent.) flows simultaneously from the acid drum into the trough (unit 1); the seed is then raised by a paddle conveyer into a drainage trough (unit 2); the delinting process continues in the second trough (unit 2) and the seed is drained of excess acid, which flows back into unit 1 for re-use. The delinted seed, passing into unit 3, is washed free of acid with water sprays while being raised and carried into a rotating cylindrical seed drier. After passing the length of the drier the seed is elevated to a sacker, and immediately put into clean bags and stored away from possible sources of infestation.

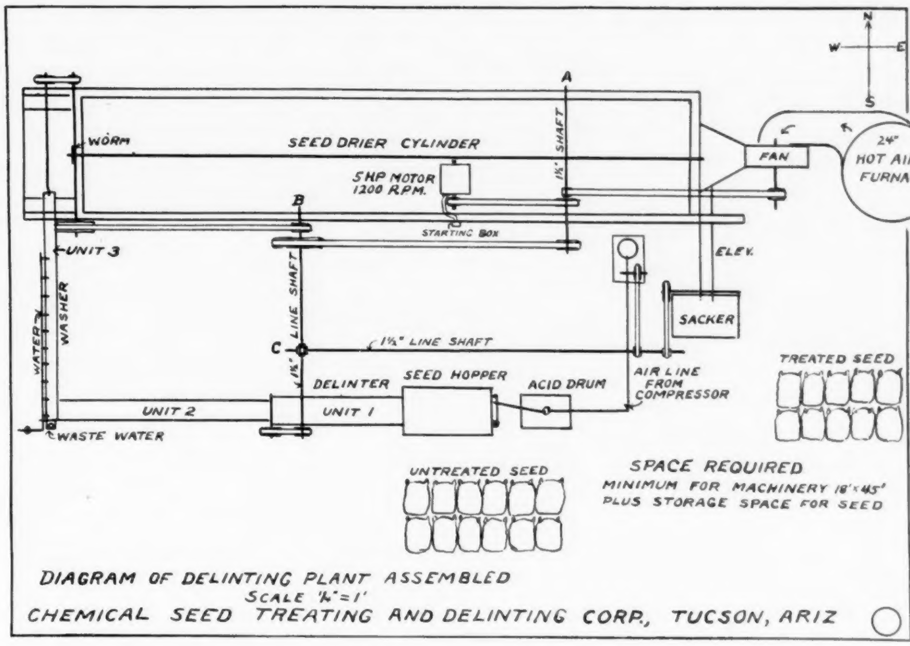
The first unit has now been in operation sufficiently long to demonstrate the efficiency of the process and disclose where improvements can be introduced. These are of a mechanical nature, having to do with a more efficient arrangement of the equipment and the more even flow of the seed through the process.

The first plant was designed and has operated at a capacity of eight tons of seed per eight hour day. This volume appears to be about the most desirable unit size. Small units are more likely to prove more economical, for the maximum operating period is only about one hundred days per year, and in addition, the question of transportation is simplified through the construction of a relatively large number of units rather than fewer but larger ones. The average consumption of cotton seed over the 1928-1932 period was about 203,000 tons of seed annually. If all of this seed were treated in plants of eight-ton-a-day capacity, working but one hundred days per annum, about 375 such plants would be required. Of course, 24-hour operation of plants would cut this figure approximately to a third.

The practice of removing lint from cotton seed before planting has much to recommend it. In the first place, closer inspection and selection is possible with the fuzzy coating removed. Furthermore, the fibrous layer affords an excellent shelter for bacteria and spores which later carry disease to the growing cotton plants. With these handicaps to selection and uncertainties as to viability, an excessive amount of seed must be planted to insure a satisfactory stand of mature plants. This in turn leads frequently to the necessity for an additional step in cultivation; that is, the chopping out of the undesirable plants. Seed-borne diseases, such as

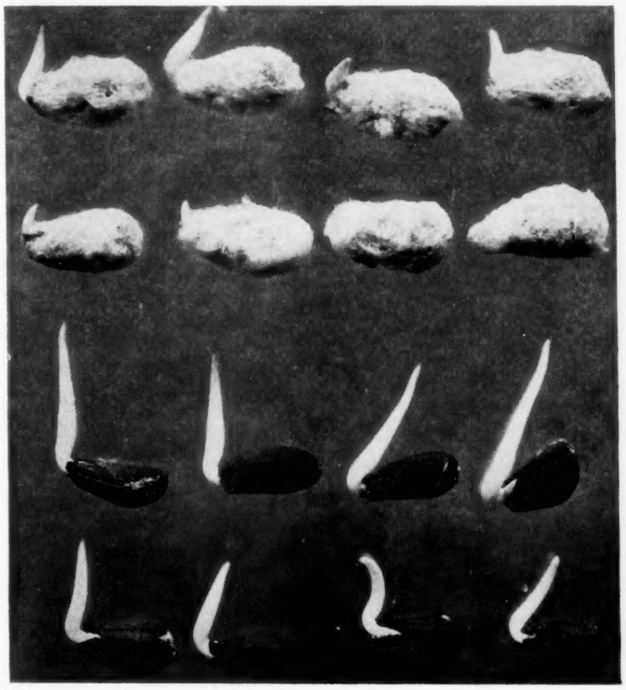
Fuzzy cotton seed, (above left) compared with seed after delinting with concentrated sulfuric (right). A bushel of fuzzy seed weighs 32 lbs.; after delinting, the seed occupies half the space, but weighs approximately 28 lbs. About one gal. (15 lbs.) of concentrated acid is required to treat one bushel of seed.

Flow-sheet of the continuous-process delinting, sterilizing and drying unit for the treatment of cotton seed with concentrated sulfuric acid developed by J. G. Brown of the Arizona State Experiment Station.



anthracnose and angular leaf spot are almost completely absent from stands planted with acid-delinted seed.

Delinted seed germinates from one to three days faster than untreated seed. The seedling gets a quicker start too, before the soil crust has formed. When soil is wet and cold, planting can be delayed to avoid the danger of rotting. The seedling stage is shortened and "damping-off" losses are less, and earlier maturity and "heavy first pickings" cut down the ravaging of the boll weevil. Finally, the actual mechanical operation of seed planting is greatly simplified when delinted seed is used.



Photograph shows that sulfuric acid delinted seed takes up water faster and so germinates more rapidly. Other advantages include better seed classification, simplified planting practices, healthier stands and increased yields.

In actual dollars and cents is there a net gain for the farmer after paying for the treating of delinted seed? All authorities appear to agree that there is. According to data which is reliable, profits derived from the crop grown from delinted seed are far greater than the cost of material, time and labor required for the acid treatment even where the delinting is done by the farmer with high-cost sulfuric. Where a central plant does this operation, the cost should be much less. Indeed, it is said that the saving in seed alone covers the cost of the treatment.

The process is patented. Present plans call for the construction of other plants, possibly through some licensing arrangement. Last season but four such plants were in actual operation but the coming season several additional will be functioning.

Appreciating the value of the process as an additional source of consumption of sulfur and sulfuric acid the technical department of Freeport Sulphur Company has cooperated with the workers at the Arizona State Experimental Station and is lending every assistance possible to the further commercial introduction of the process in other important cotton growing sections.

1935 Zinc Statistics

Preliminary statistics from the Bureau of Mines on zinc in 1935 indicate a number of favorable factors in the domestic situation. Production of metal from domestic sources increased about 16 per cent., but apparent domestic consumption was at a rate approximately 32 per cent. higher than in the preceding year, and stocks of refined zinc were substantially reduced. On November 30, '35, stocks of zinc at smelters were only 55 per cent. of the record high stocks on hand at the end of '30 and were the lowest recorded since the end of '29. Production of metal from foreign ores and concentrates was relatively the same as '34 while production of secondary distilled zinc increased considerably, following a large decline in output of this class in '34.

Hints on the Care of Turbines

Importance of Lubrication

By C. H. S. Tupholme

THE many claims of turbines for generating power and heat for chemical operations are certainly justified in many excellent points which make them a valuable means for reducing operating costs. But it is a mistake to imagine that the turbine, because of its basic simplicity of design and proved reliability in service, is a unit which will go on forever with very little, or no, attention. The trouble is that the turbine, because it demands the minimum of attention, often gets almost none.

Almost the sole point about the turbine which demands serious consideration is its lubrication. Probably in no other industrial application of oil is the operation of so large and expensive a mechanical device dependent upon the quality of so small a quantity of lubricant. Moreover, the consumption of lubricating oil depends on its quality, so that the entire oil charges are at the minimum when the quality of oil best adapted to the requirements is employed. Hence, engineers in charge of turbine installations must be cautious of experiments with grades of oil with which they have not had previous experience, and knowledge of turbine lubricating requirements is at a premium.

Steam turbines vary widely in size, speed, and steam pressure. They may be divided roughly into three classes: high, low, and mixed pressure. The first type is operated by steam at a pressure in the neighborhood of 200 lbs. per square inch, and the steam is usually superheated to a considerable degree. Low-pressure turbines are operated by the exhaust steam from reciprocating engines or from other steam-driven industrial appliances. The mixed-pressure type utilizes either high-pressure or exhaust steam, whichever is most economical and convenient. Such turbines may be designed primarily for exhaust steam and to employ high-pressure steam only when there is a shortage of exhaust steam, or vice versa.

There are two types of turbines operating on fundamentally different principles. The impulse type, of which the original is the de Laval, is operated by the kinetic energy of the steam which is caused to impinge on the rotating blades. Turbines of this type are usually constructed in the smaller sizes and generally operate at high speeds up to 30,000 r.p.m. The Parsons turbine is operated by the expansion of the steam acting on the blades of the rotor. This type is manufactured in the largest sizes and generally operates at lower speeds from 1000 to 3000 r.p.m. Turbines also exist which use both impulse and expansion principles.

Although varying greatly in size, speeds, and type, all steam turbine lubricating problems are simpler than of many other prime movers. The only parts to be lubricated are plain bearings and the governor gear. No parts to be lubricated in any way correspond to the pistons, valves, and other moving parts of reciprocating engines. The blades require no lubrication, in fact, greatest care is taken to avoid their coming into contact with any lubricant present in the steam. The bearings are usually of the white metal type and although in some small turbines they are lubricated with oil rings, in larger plants the lubricant is supplied by means of pressure pumps. As the load on the bearings is exceedingly steady and free from valve pulsations, conditions of operation vary but slightly. Nevertheless, special requirements must be satisfied by a first-class turbine oil.

It must be used for a prolonged period under turbine conditions, that is to say, it will be circulated, heated, cooled, frequently exposed to the action of air and water, and yet undergo minimum change. All lubricating oils have a tendency to absorb oxygen from the air with the formation of acidity and, after prolonged use, the deposition of tarry precipitates, usually termed "sludge." A contributory cause of sludge formation may be electrolytic action, due to the leakage of current from generators. This "sludge" is a bituminous substance formed by the oxidation of the oil itself. Animal and vegetable oils are unsuitable for turbine lubrication, owing to their tendency to form sludge and to emulsify. Even mineral oils, with their relatively high stability, are affected under these conditions for a prolonged period. By extremely careful refining to remove bituminous substances, coloring matter, etc., the tendency to form sludge may be considerably reduced. By the selection of suitable crudes for the manufacture of the turbine oil, it is also possible to produce oils almost free from sludging.

Sludge in the turbine circuit will settle in the tanks, but a certain amount, which may be in such a fine state of division as to pass through filters, will be passed on to the bearings and, as sludge possesses no true lubricating properties, it consequently increases the coefficient of friction and the wear on the bearings.

Water may enter the lubricating oil circuit from condensed steam passed from the packings into the bearing or by leakage in the cooling tubes. Such water is churned up with the oil in the supply pumps, which are usually of the toothed-wheel variety, and forms an emulsion. It is essential, therefore, that the oils used on turbines should have the property of rapidly separating from water, so that the water may be withdrawn periodically from the supply tanks. Many mineral oils, otherwise satisfactory, form a permanent emulsion

when agitated with water. Several methods for the scientific determination of demulsification values are used in the laboratory valuation of turbine oils, and the possession of a good demulsification value is a matter of vital importance.

In lubricating turbines there is no necessity for a highly viscous oil, providing that the bearing is of ample dimensions; and the turbine bearings are always of quite sufficient size to operate with the greatest satisfaction on comparatively thin oils. Only when the bearings are subjected to exceptional stresses and high temperatures are viscous oils necessary. Excessive viscosity only results in an unnecessary amount of power being absorbed by fluid friction. The temperature of a bearing is also affected by the viscosity, oils of high viscosity increasing the running temperature of the bearing.

At the same time, the lubricant must have viscosity higher than that absolutely necessary for running, to give a safety factor against unforeseen circumstances and to ensure a certain amount of oil remaining in the bearings after the turbine has been standing for any considerable period. In the larger turbines provision is made for flooding the bearing with oil prior to starting up. Since the temperature of the bearing may vary, being comparatively cool at the commencement of the run and heating up until it attains an equilibrium, it is preferable to use an oil with a minimum change of viscosity with increase of temperature. The variation in viscosity with a given change in temperature is thus a point in the evaluation of turbine oils, and although all mineral oils undergo a considerable reduction in viscosity with increase in temperature, it is possible to buy special grades in which this change is reduced to a minimum. The change in viscosity with temperature is not only of importance in connection with the varying temperature of the bearings, but also in connection with the cooling of the lubricating oil in the oil coolers.

An oil which becomes excessively viscous when cooled down does not lend itself readily to cooling down when passed through the cooler tubes. High viscosity interferes with the motion of the oil in the tubes and reduces the cooling effect due to convection and to the motion imparted by the lubricating pumps. The coolers employed in turbines are usually straight-tube types through which the oil passes, surrounded by water, or the reverse system may be employed. Periodic inspection of the coolers and their maintenance in good condition are of the greatest importance. The rate of change of viscosity with variation in temperature is best observed by testing viscosity at several temperatures and then plotting the results in the form of a graph, when it will be found that the better quality of oils gives a graph with less inclination in the curve than that given by inferior oils.

Although the flash point is not of great importance, it is advisable to have an oil of comparatively high flash as an indication of careful refining. Also, the flash point is to some extent a measure of the tendency to evaporate, although the actual evaporation figures are not a direct function of the flash point. It is not necessary for them to possess a very low freezing point, but oils used for turbine purposes should not freeze at a temperature much over the freezing point of water.

A dark and turbid appearance indicates that the coloring matters have not been removed from an oil. The best quality turbine oils are either pale or clear red to transmitted light. A number of minor tests are employed from time to time in the valuation of turbine oils, but those mentioned are the most important.

Turbine oils undergo a practically continuous recovery process in the actual circuit of the turbine. They are filtered each time in passing through the circuit, and are allowed to settle a short time, when the water may separate out. It is, however, an advantage to withdraw oil and subject it to further recovery treatment, either a prolonged period of settling, in order to remove any mechanical impurities, or passing through a centrifugal machine. The former process involves a large quantity of oil, so that the settling may take place for a considerable period. The latter process has the advantage of being extremely effective and rapid. Settling processes must be conducted on an intermittent system, a certain amount of oil being withdrawn and treated, after which the oil can be returned to the circuit and another quantity withdrawn. Under the centrifugal system a portion of the oil may be continuously withdrawn, passed through the centrifuge, and returned to the circuit. This bypass circuit may be kept in operation either for the whole or a portion of the working time. The very high speeds employed in centrifuges, such as the Sharples super centrifuge (17,000 r.p.m.) and the de Laval machine (6,000 r.p.m.), ensure a practically complete removal of even the finest dust of mechanical impurities, and a complete removal of water.

Suggestions have been made for regenerative treatment with Fuller's earth, bauxite, or other decolorizing materials, in order to remove any trace of asphalt formed by oxidation of the oil. Experiments have also been made with alkaline reagents with the object of removing any free acids formed by oxidation. But both these processes are complex and, in the majority of cases, unnecessary. Alkaline treatment is particularly risky, as if any alkali is allowed to pass through the circuit it may bring about a serious emulsification of the oil with any water which may be present. During use the oil undergoes comparatively little change, the viscosity remaining practically constant, while the specific gravity and flash point are also scarcely affected. The only impurity gathered during use which may affect the working of a lubricant is a trace of suspended particles of metal, caused by wear of the bearings, and traces of sand picked up from the insides of the unmachined surface of the casings, the latter being more particularly dangerous during the first period of running of the installation.

In Defense of Gases

By Walter L. Savell

Technical Advisor, The Mathieson Alkali Works, Inc.

AN old volume contains the following passage:—"They contend that, inasmuch as Nature has concealed metals, far within the depths of the earth, and because they are not necessary to human life, they are therefore despised and repudiated by the noblest, and should not be mined, and seeing that when brought to light they have always proved the cause of very great evils, it follows that mining is not useful to mankind, but on the contrary, harmful and destructive. Several good men have been so perturbed by these tragedies that they conceive an intensely bitter hatred toward the metals, and they wish absolutely that metals had never been created, or, being created, that no one had ever dug them out. The more I commend the singular honesty, innocence and goodness of such men, the more anxious shall I be to remove utterly and eradicate all error from their minds and reveal the sound view, which is that metals are most useful to mankind."

These words, published in 1556, and part of a detailed argument of ten thousand words, were presented as justification for the use of metals and in an attempt to establish the respectability of mining and smelting as industries and occupations.

Although precious and common metals had been in use for many centuries prior to 1556, it is quite obvious from the written argument that those engaged in the activities incident to their final useful forms were considered to be something less than honorable. Even the metals themselves were regarded as being inherently evil.

Georg Bauer, German author of the argument, was a man of great learning. His skill and intellectual ability had been acknowledged by the Universities, in accordance with the custom of his time, by changing his name to its Latin equivalent, Georgius Agricola.

Having made a serious and comprehensive study of the arts and sciences of mining and metallurgy, he wrote in great detail what is probably the first systematic treatment of these subjects The book, written in Latin, is entitled "De Re Metallica," a free translation of which would be "Concerning Metals." It is significant that he felt it necessary to defend his interest and work against the popular prejudices by the strong and able argument favoring the metals and those engaged in their preparation.

The strength and nature of the prejudice may be illustrated by a few of his own words:

"The curses which are uttered against iron, copper and lead have no weight with prudent and sensible men, because if these metals were done away with, men, as their anger swelled and their fury became unbridled would assuredly fight like wild beasts with fists, heels, nails and teeth. They would strike each other with sticks, hit each other with stones, or dash their foes to the ground. Moreover, a man does not kill another with iron alone, but slays by means of poison, starvation or thirst."

By means of many excellent but horrible examples, he proves that man can and does "make every element a participant in the death of men."

In our time this strange resentment against the use of metals no longer persists, and we feel that such blind prejudice cannot survive. Consider, however, the sentiment and opinion expressed in the following statement:

"Any man who prostitutes science to the production of a gas that can be used to poison men in war is an enemy to society and should be treated as a dangerous criminal."

This condemnation was part of a sermon I heard a short time ago in a church located in a town of some 50,000 inhabitants. The minister, a man of modern education, in a position to influence public opinion, is today presenting reactionary ideas that might be expected only from the most ignorant and untrained. In him and many others we find the same type of prejudice that has handicapped progress from time immemorial.

Thus, we are startled into the realization that ignorance and error are still with us, as strong and deep as that of Agricola's time.

We know that the alchemist, predecessor of the chemist, in his search for the alkahest or universal solvent and in his attempts to transmute base metals to gold was regarded by many of his contemporaries as a lunatic or something akin to a witch. We are taken back, however, when faced with the fact that numbers of our own contemporaries look askance at chemists as men engaged in a mysterious and somewhat sinister occupation.

The mystery and slight distrust with which some people view the chemist seem to be emphasized in the case of one concerned with the production or use of gases. There is a surprisingly large popular opinion that all gases are explosive, poisonous and generally fearful. In spite of the fact that, unknown to the suspicious individual, many of these gases are in daily service for him, he regards them with fear and those who produce them as intellectually queer if not actually anti-social.

It seems opportune to call attention to these facts at this time. War, and rumors of war, serve to sharpen the public ear for certain words. In time of general

peace the word "gas" has several connotations to the average man according to time, place and condition. At home, it means fuel for his kitchen stove and the crooked corporation that threatens to shut off his supply if his bill is not paid within ten days from date. If somewhat dyspeptic, it may mean discomfort after meals, and bicarbonate of soda. Peculiarly enough, the word does not make him think of the ammonia, sulfur dioxide, methyl or ethyl chloride, or other refrigerant used in his refrigerator. In his automobile "the word gas" immediately changes its meaning to indicate motor fuel, but never the air that is so necessary to fuel combustion or the acetylene, hydrogen and other gases that have been used in the building of the car. At the office it becomes a clever word for vocalized and articulated breath ejected aimlessly—perhaps conversation to kill time. This kind of gas often compresses the office work into the last half hour of the day and enables him to tell the wife how busy he has been and justifies him in asking the boss for a raise. It never has any association within his mind with the sulfur dioxide and chlorine that were used to make the paper on which he transcribed his immortal thoughts during the day.

The word gas has only one other meaning to John Q. Public. Were it not for a sympathetic feeling for the average man and a naturally humane attitude, we could almost wish that there were more toothaches. Only when he visits the professional specialist now known as an Exodontist, does Mr. Public come face to face with a gas and acknowledges the introduction and its beneficent nature. In the dentist's chair, gas means a surcease from pain. It seldom occurs to the patient to inquire just what gas was used to lure him into a merciful sleep so that the fractious and tormenting molar might be forcibly removed without discomfort.

When war is in the air the word "gas" has a new meaning to the man on the street. It is a complete story of wholesale destruction of armies and perhaps the peaceful inhabitants of cities. It brings up pictures of fiendish, white-coated scientists working ceaselessly to invent and produce more and more horrible forms of this terrifying agent of death.

The fault for these erroneous impressions and opinions probably lies with those of us engaged in the manufacture and use of industrial gases.

Since the earliest history of applied chemistry, gases and their reactions have entered into chemical processes. We know that the discovery of gases or the invention of methods of laboratory or commercial production are the result of the work of patient and peaceful men whose aims were to increase the sum total of human knowledge and to add to the comfort and cultural opportunities of the human race.

We know that war was carried on without the use of poison gases before and long after such gases had become a necessary part of chemical manufacture; also, that the quantities of gas used in the last war were insignificant by comparison with the gas requirements of industry. The total amount of gas used at the front during the World War was less than the present demand of the chemical and allied industries for one week.

We know, too, that these gases serve our entire population in almost every phase of existence. Food, beverages, water, clothing, transportation, medicine, housing and even the furniture and rugs on the floor are better for the effects of gases which touch their preparation at one or more points.

The public may remember the story of gas as a military poison. It is doubtful if many realize that the conclusion of that splendid research has led to the production of synthetic chlorinated rubber, a highly important industrial material. This product with properties entirely new to human experience, is already serving man in his most peaceful pursuits.

We have at our hands hundreds of facts that would assist in eliminating the popular fear and prejudice against commercial gases. It would be reasonably easy to compile a list of at least a thousand applications of gases in a few hours.

Of course, many gases in common use are actually toxic. That, however, merely imposes definite conditions for their handling and does not detract from their importance in use. On the other hand, a human being cannot live in any gas which is relatively pure.

Sixty-four years after the discovery of this continent by Columbus, Agricola argued against a popular condemnation of metals. The scene has changed. Metals are no longer reviled as evil. A similar lack of understanding on the part of the public seems to have shifted the same kind of prejudice to gases. It is our duty to inform the public of the importance of gases in their daily life so that they may be assured of the essentially peaceful nature of these extremely useful commodities. Our sentiment should be that expressed by Agricola: The more we commend the singular honesty, innocence and goodness of such men the more anxious should we be to remove utterly and eradicate all error from their minds and reveal the sound view, which is that gases are most useful to mankind.

Industry's Bookshelf

Volumetric Analysis by Francis Sutton (12 Ed.), revised by A. D. Mitchell, 631 pp., Blakiston's, $10.

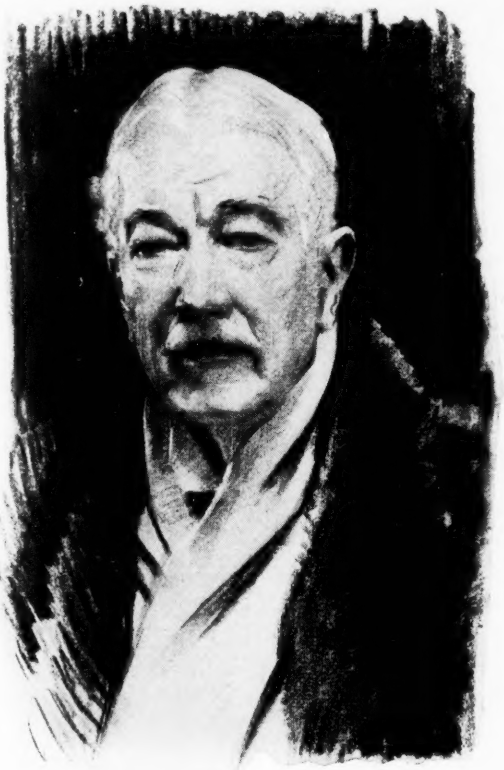
Little need be said about this latest edition of "Sutton's." Chemical industries have always been sympathetic with the advantages of rapid volumetric analysis over the more detailed gravimetric methods. The rapid growth of chemical knowledge makes constant revision of these standard texts essential.

Your Invention—How to Protect and Merchandise It by Elmore B. Lyford, 205 pp., Radio & Technical Publishing Co., $1.50.

Plain everyday language simplifies patent procedure, and Lyford cuts legal red tape so that the reader may safeguard and merchandise his invention. There are many modern tricks in patents, and this book should aid in protecting the inventor.

The Makers of Merrimac

The Cochranes and Eaton the Howards and Wilder



Alexander Cochrane, Jr., president, Cochrane Chemical Co., 1872-1917. From a charcoal drawing by John S. Sargent.

IN the autumn of 1843, a middle-aged Scotch acid maker came to Boston to seek his fortune in the New World. He was a stubby, nubbly Gael with sandy hair and twinkling blue eyes; a quick, flashing wit and slow but violent temper. His outstanding characteristic, however, was his super-abundant energy.

In those days, the regular hours in a chemical plant were from seven in the morning till six at night, with a half hour out for lunch; but "overtime" or "after hours," at work or at play, that dynamic little Scotsman was bound to be a hard-driven leader, whipped by his ambitions to hold always the first position. He died sixteen years later, worn out, still a comparatively young man; but in that short time he had gone into business for himself, establishing what was destined to become the most important chemical operation in New England, and training two stalwart sons to carry on the enterprise.

In these days, we should call Alexander Cochrane a "chemical engineer," though he never studied either chemistry or engineering. He had been thoroughly trained, however, in that gruelling school which was personally conducted by British chemical manufacturers of the class of Muspratt, Gossage, Gamble, Deacon, Spence, *et al.* The men of that famous group were real chemical makers. They worked out their own processes themselves, built their own apparatus, turned out their own products, and finally went out and sold them. With such an experience tucked away in his retentive brain and stored up in his dextrous hands, just at a time when the rapid expansion of the New England textile and paper industries was creating a fast-growing demand for heavy chemicals, Alexander Cochrane cannily judged his opportunity in Massachusetts.

First he went to work as a chemist for Lee & Blackburn, but very shortly left to take charge of the chemical operations at the Talbot Chemical Works at Billerica. He was keeping step with local chemical progress, for the old Talbot Dye Works, specialists in logwood, had just branched out into the chemical field with sulfuric and muriatic acids and blue vitriol. It is not difficult to guess how useful this practical Scotch chemical man was in this new chemical plant, nor is it hard to surmise how this experience fired his ambition to employ his talents for his own account. He had learned first-hand how to plan and carry out successfully new methods and processes, and he knew very well that there was a ready market at good prices for the chemicals he could make. Accordingly, he resigned as superintendent of the Talbot chemical plant in 1847 and immediately opened his own works in an ancient stone building at the corner of Medford and Green streets in Malden.

Had there been but a thin streak of superstition in this Scotsman's make-up, he would never have selected this location. His buildings had previously been occupied by a bankrupt dye works and the land had formerly been the old Bellrock cemetery. Several of the old gravestones were still on the property; in fact, one old rectangular tomb of red sandstone, fitted with a wooden cover, was used for a packing counter inside the shed which was the plant's first shipping department. His workmen, however, were not so impervious to eerie influences. The unknown inhabitant of that tomb soon won the reputation of ruling the destiny of the entire operation, and it was considered dangerous to treat him with disrespect. When young Johnny McCarthy, a handy man about the plant, who with reckless hardihood delighted to insult this poor ghost and kick and spit upon his tomb, was severely burned with a solution of hot indigo and sulfuric acid, this superstition became

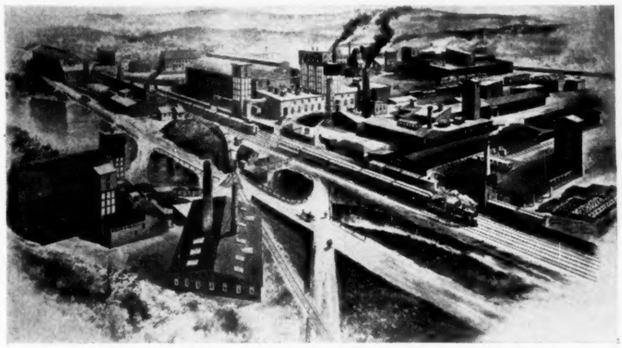
so fixed that Mr. Cochrane had all the headstones and tombs on the property dug up and carted away.

This same Johnny McCarthy is the hero of the only personal anecdote of Alexander Cochrane, Sr., that still lingers in the Merrimac Chemical Company's annals. He was working ten hours for a dollar and a half a day—which itself is a most illuminating commentary on the changes which the past half century have brought to the chemical industry—and not unnaturally he sought a raise. His foreman, James Stewart, said, "Johnny, m'lad, I dinna like t'ask Mister Cochrane for a penny more for ye, me knowin' how worrit he is; but I will na say 'nae' to your askin' y'sel'."

For several weeks young McCarthy pondered this problem, and at last, screwing up his courage, spoke to his employer.

"What," asked Mr. Cochrane, not unkindly, "do you want more money for?"

"For more food to eat and better clothes to wear," came the quick answer, and he showed his work clothes



Woburn Plant, 1899-1914.

and explained that they wore out so quickly with acid holes that he had very little money left for room and board.

"Food and raiment are necessary evils," commented his employer, his blue eyes sparkling, and turning to the foreman he asked if McCarthy was a good workman.

"Aye," replied Stewart, "he's a guid lad to worrk and tries always to do his verra best."

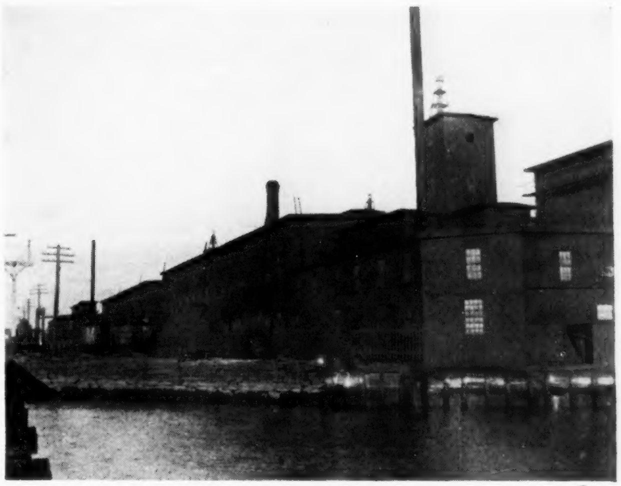
"Good! Henceforth, give him a dollar seventy five."

The tradition of fair treatment and friendly personal relationship associated with the memory of the company's founder is still cherished. Few chemical corporations have brought up from the ranks so many of their major executives, both in the administrative and operating departments. No company has a brighter roll of long-service employees, son often following his father.

Again, this tradition goes back to Alexander Cochrane himself who, very soon after he embarked in his own business, brought in two sons, Alexander, Jr. and Hugh, to work with him. Early in the fifties, he took them both into partnership, organizing the firm of A. Cochrane & Company, proprietors of the Malden Chemical Works. When he died on August 11th, 1865, they were ready, trained and in responsible posts, to carry on. Indeed, they had already proved their capabilities, for they had not only shared in the expansion of the business during the Civil War period, but they had also each made a real contribution to the growth of the enterprise; Alexander, Jr., in the office and Hugh in the plant.

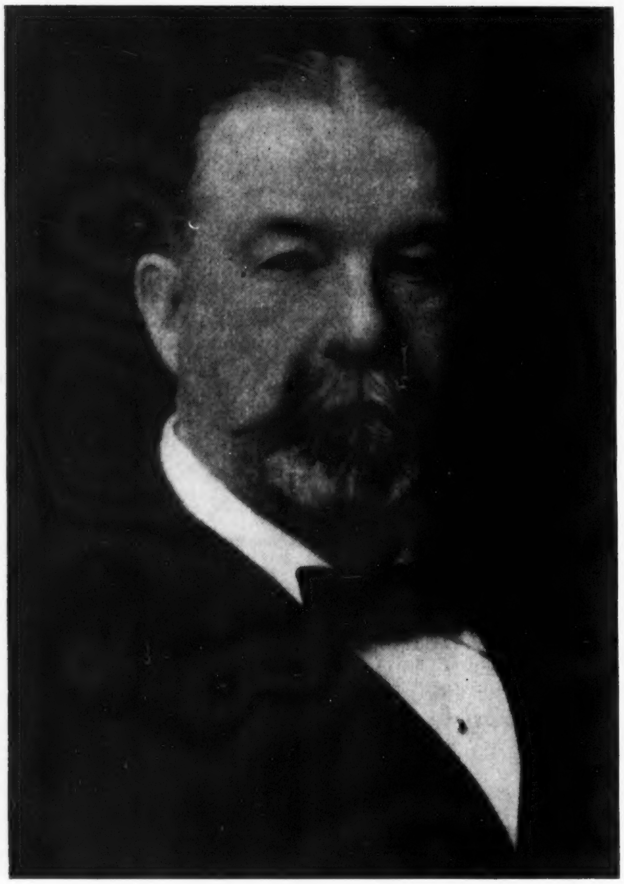
The two sons were strangely alike, yet they were curiously distinct personalities. Both inherited their father's sandy hair, choleric disposition, and tremendous nervous energy. Both were quick in their movements, and extremely nimble witted. They were both very friendly, sociable men. In very different ways they worked off their excess energy in a number of hobbies. At this point, they differed sharply. Alexander, Jr., was a hunter: Hugh, a yachtsman.

Besides his home on Commonwealth Avenue in Boston, Alexander Cochrane, Jr., owned a farm at Hamilton and a summer home at Pride's Crossing. He was an ardent fisherman and duck hunter, a member of the Aristigooch Salmon Club and Longpoint Company. He was a public-spirited leader in many charities, a vestryman of Trinity Church, and possibly his greatest social service was performed as chairman of the trustees of the Peter Bent Brigham Hospital, a post he held during the critical period when the new hospital was built. His brother Hugh was less active in public affairs, from which his exaggerated dislike of any personal publicity made him shrink, though with scrupulous



Cochrane Plant, Everett, Mass.

lack of advertising he was a very generous patron of the arts and loyal supporter of charitable institutions. Hugh was a genial and friendly man, kind-hearted to a degree, who had a host of warm friends and was so greatly beloved by his employees that all the office staff and more than three hundred of the workmen from the plants attended the funeral. He was tremendously fond of the sea, and his yacht "Tioga" and schooner "Oenone" were his great hobby, enjoyed especially because of the opportunity they gave him for entertaining his friends.



Hugh Cochrane, vice president, Cochrane Chemical Co., 1872-1904.

Each of these brothers made his distinctive contribution to the business: Alexander, Jr., in the office and Hugh in the plant. The combination of financial and operating talents was a happy, and to the company a profitable, one.

After the death of their father at his summer home at Newburyport on August 11, 1865, these two brothers took up the direction of the business which at the time was known as the Malden Chemical Works, A. Cochrane & Sons, Proprietors, a co-partnership in which they had inherited equal shares. The original product had been sulfuric acid, to which muriatic and nitric acids were soon added. During the fifties, about the time Alexander Cochrane, Sr., took his boys into the firm, the business and equipment of the Newton Chemical Company, situated at Waltham, had been purchased.

This purchase brought to the Malden plant one extremely important piece of apparatus, a platinum still which had been built but a few years previous by an Austrian engineer. This still enabled the Cochranes to produce a higher strength sulfuric acid, using brimstone from Sicily as a raw material, than was offered by any of their competitors. It was moved from Waltham to the Malden plant and twenty years later moved again to Everett where for two decades longer it did active service.

Youth is adventurous and ambitious, and the young Cochranes, after their father's death, determined to venture forth into the dyestuffs field. They selected indigo extract for their initial effort, and after a series of disheartening failures, Hugh, who was already in command at the plant, went abroad to learn from European producers how to make a marketable article. He was away nearly twelve months and after his return was successful in producing a thoroughly satisfactory extract. As indigo was in demand all over New England, this venture turned out to be a very profitable department. Over and above the money made from this indigo venture, it widened their market, increased the number of customers, and gave them the confidence necessary to undertake research with the object of adding new chemical products to their line.

Munitions demands during the Civil War caused a considerable expansion of the operations at Malden and combined with the growth of the residential section of that city about the plant, made necessary a change in location. For three years, the Cochrane brothers studied this problem, visiting likely situations, inspecting available buildings, warmly debating the pros and cons of every possible location. At last they agreed that the best prospects were offered by an opportunity to buy out the New England Chemical Company, competitors in the sulfuric acid market, and to remove to their plant at Everett. By this purchase, they acquired one large and four small buildings on five and a half acres of marshy flats lying along the Mystic River. They revamped the chamber apparatus in the large building from a pyrites to a sulfur operation; moved their cherished platinum still and the best of their other equipment; changed their partnership into a corporation under the style of The Cochrane Chemical Company; and during the summer of 1872 established themselves at Everett on the site where the vast plant of the Merrimac Chemical Company now stands.

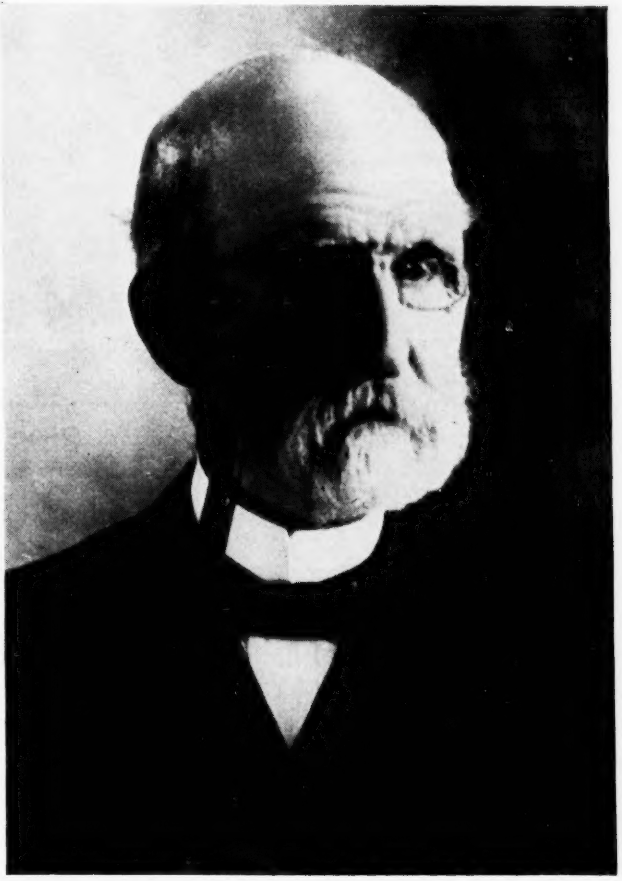
This property is almost at the foreshore of Boston Harbor and at the back boundary of the original purchase run two railways, the main line of the Boston & Maine and the grand junction of the Boston & Albany. The Cochranes had hardly settled down in their new plant before it became plain that very shortly they would be needing more land for expansion. Across the tracks, on slightly higher ground, lay large deposits of clay from which were manufactured high-grade pressed and baked bricks. The fine quality and handsome cherry-red color of these bricks made them high favorites with both builders and architects and many of the finest buildings erected during the past century in and about Boston were constructed of them. Directly opposite the chemical plant was a parcel of land held under a ten-year lease by the firm of D. Washburn & Sons. As the Washburns had worked out three enormous pits and about exhausted their clay supplies, they were quite willing to give up their expiring lease, and on March 21, 1874, the chemical company purchased ten and a half acres.

This land had been originally a part of the colonial

grant to the Lynde family. The daughter of Seth Lynde was Dr. Sullivan's wife: their daughter had married Alexander Cochrane. Dr. Sullivan had been one of the original incorporators of the Cochrane Chemical Company.

Later, Seth Lynde was to lend his grandson-in-law, Alexander Cochrane, fifty thousand dollars which so quickly multiplied to a great fortune that, despite his Scotch upbringing and New England surroundings, Alexander Cochrane, Jr., became a sincere devotee of the goddess of Good Luck. His belief in that fickle jade, however, was of the sort summarized by Cromwell when he admonished his soldiers: "Trust in the Lord, and keep your powder dry." Telling the story of this fabulous investment, Alexander Cochrane always emphasized the fortunate chance that opened up this opportunity, rather than his own shrewd foresight that prompted him to embrace it.

Shortly after they moved to the Everett plant, the Cochranes began selling acid to a maker of electrical wet batteries named Hubbard. His orders were regular enough, but his payments were extremely irregular. His account finally fell behind as much as several hundred dollars, and Alexander, the business manager, went over to see what might be done about it. This task was made the more difficult by the fact that the Hubbards and their son-in-law were personal friends of his and his wife; and he was finally persuaded, rather against his better business judgment, to accept in payment stock in the little electrical company. Hugh, the plant manager, did not approve of this settlement, so in fairness to him Alexander offered to take over this stock and assume the Hubbard liability on his personal account. This was satisfactory to his fellow stockholders, and he was thus brought into close business relationship with this struggling electrical enterprise. The son-in-law was a professor in Boston University, the technical brains of the business. His name was Alexander Graham Bell.



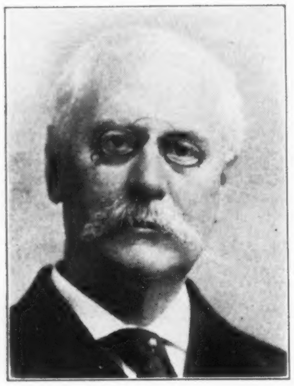
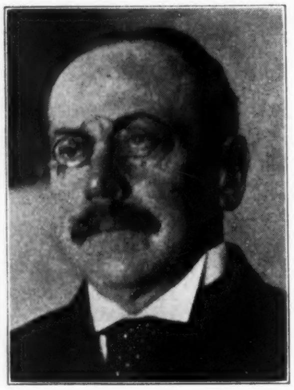
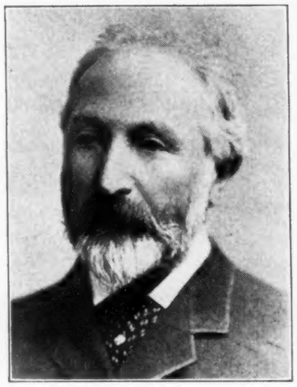
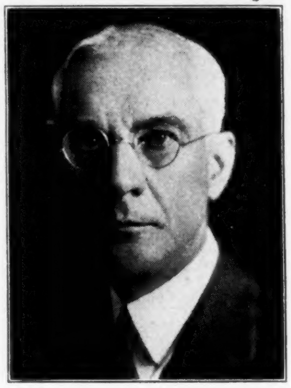
Robert B. Eaton, founder, Merrimac Chemical Co., 1853-1871.

In this wise, Alexandei Cochrane was "on the inside" when the invention of the telephone was perfected and was already a shareholder in the company which became the nucleus of the American Telephone and Telegraph Company. His belief in the future of that invention prompted him to back the initial expansion even to the extent of borrowing funds for this purpose. He thus became one of the largest stockholders in the original Bell Telephone Company, an investment which he attributed to luck, but which made him one of the wealthiest men in New England. In later years, his outside interests weaned him away from his direct connections with the chemical company; but he was long the general administrative head of the business and always its guiding spirit in financial matters.

When the Cochrane Chemical Company first took over the ten acres west of the railway tracks, this was a tough looking piece of land with its mud and marshes, its yawning clay pits and dilapidated brick sheds. The attractiveness of the site was in no wise improved by Thompson's slaughterhouse which stood alongside at the waterfront. The aroma, though a stout competitor with hydrogen sulfide fumes, would not have interfered with the manufacture of chemicals, but their wastes so polluted the water supply as to be a menace to operations. Accordingly, the Thompsons were bought out, being paid in stock of the chemical corporation.

Now the Cochrane Chemical Company was properly set up for expansion. Very rapidly they began to clean up the land across the tracks. Building after building was added: in 1879 the "New South" plant; 1881, the "West Works" and the acetic acid-Glauber's salt plant. This same year the Cambridge Chemical Works was bought and for a time both plants operated. This purchase added another sulfuric acid unit and a new product, ammonia.

In the fall of this year, after vain efforts to get well trained chemists with American plant experience, Augustus Olsen and John Enequist, were brought over from Sweden as Superintendents. C. R. Gyzander was also engaged as chemist in charge of the laboratory. In 1882, Frank G. Stantial became superintendent of the Malden and Cambridge works, and three years later was given James Lund as his assistant. When Olsen left in 1888, Stantial moved up to the Everett plant and Lund succeeded him in charge of the two smaller operations.

Left to right, four executives of Merrimac Chemical Co., Charles T. Howard, treasurer, 1871-1902; *Alonzo P. Howard, vice-president and director from* 1871-1905; *Barthold Schlesinger, president and director,* 1877-1900; *and extreme right, Salmon W. Wilder, president and treasurer,* 1893-1929.

Growth of the operations and birth of additional products is told in the successive building of plants at Everett. In 1892, the manufacture of indigo extract was moved to a new building and the old Malden plant definitely abandoned. A sulfate of alumina plant was built in 1893 (re-built 1911); ammonia, 1894; a new acetic acid building, 1895; No. 18 Building, 1897; sodium and sulfide, 1903; a contact acid plant in 1907; and glue works in 1915.

In the spring of 1902, Hugh Cochrane, who throughout the past thirty years had directed this sustained program of expansion, returned from Europe a seriously ill man. During the summer he recovered and in the fall seemed to regain his accustomed vigor; but early in the winter contracted influenza and died at his home in Boston, January, 1904.

Lindsley Loring Becomes Executive

It now fell upon one of Alexander Cochrane's sons-in-law, Lindsley Loring, actively to represent the family interests. He became vice-president and later treasurer. Intelligently and energetically he took up the duties of the active administration of a large and growing chemical manufacturing business. Since the death of his father, Alexander Cochrane had served the company as president. His brother had left no sons and none of his own three boys was chemically inclined. He recognized clearly that the World War was not only presenting golden opportunities for aggressive development, but that it was also entirely remaking our chemical industry. He felt too old to buckle on armour again in this new fight. There was no necessity for his doing so, yet the future of the business demanded a reorganization. Accordingly, in 1917, he sold out his interests and the Cochrane Chemical Company was merged with the Merrimac Chemical Company.

It is now necessary to go back again to the Talbot Dyewoods Works, where Alexander Cochrane, Sr., got his start in the American chemical industry, and even to their predecessor and one-time competitor, the Woburn Chemical Works. The year is 1853. The growth of the New England textile and paper industries, which fifteen years later created the market for Cochrane's chemical operations, had even then reached a point where a rival to the Talbots (established in 1840) might reasonably be expected to prosper. At least, so reasoned Robert B. Eaton, an importer and merchant who had first-hand knowledge of the chemical needs of these manufacturing consumers.

Mr. Eaton had, however, practically no knowledge of chemical making; but this did not dismay him. With a staff consisting of a good plumber and a couple of experienced chemical workmen he went to work to produce sulfuric acid in a tiny plant at Woburn.

Eaton Expands His Products

How he did it nobody now knows. He not only made sulfuric acid and sold it profitably; but he also in time produced muriatic acid, soda ash and salt cake, Glauber's salt and nitric acid, and tin crystals. The initial output was small and the earliest operations must have been unbelievably primitive; but Robert Eaton was ingenious and persevering. His processes improved and his production grew. As he was thoroughly immersed in his manufacturing problems, he turned over his sales to his good friends Candler, Foster & Co.

At the outbreak of the Civil War, an opportunity for timely expansion presented itself. The sulfuric acid production of the Merrimac Manufacturing Company of Lowell, and Mr. Eaton's Woburn works were all combined on November 27, 1863, under the corporate name of the Merrimac Chemical Company. John W. Chandler, the former sales agent, was the first president; the treasurer was C. D. Kellogg; Robert Eaton and W. L. Candler were incorporators and directors. A little later, Page Eaton and Charles O. Foster joined the board. The management continued with Mr. Eaton in charge at the plant and Messrs. Chandler and Foster at the offices in Boston.

After the Civil War, industrial New England blossomed in a heyday of prosperity. Additions to the productive capacity of the chemical plant at Woburn required additional capital, so the stock shares were

increased; and in 1871, the Howards became financially interested in the business. C. T. Howard was elected treasurer and A. P. Howard, a director. At the same time, Dr. Charles McBurney was added to the board. In 1877, Barthold Schlesinger, a former partner of Naylor and Company, of New York, and already a large stockholder in Merrimac, became a director. In 1884, he was elected president, and held office until his death in 1902.

Throughout this period the active management was in the hands of the Howard Brothers, A. P. Howard directing the production and C. T. Howard in charge of the office. In 1889, Henry Howard joined the staff as chemist and upon the death of A. P. Howard, his father, succeeded him as superintendent, later becoming a vice-president.

During the Howard regime, Merrimac materially improved its manufacturing operations and considerably diversified its products. Theirs was a chemically-minded administration, primarily concerned with production; and they laid down very solid foundations under the plants. Alum and sulfate of alumina were produced in 1886; bisulfite of soda and iron nitrate in 1887; aluminum chloride (the first made in America) in 1888. That same year a pyrites process, developed in their own works, was put into successful production of sulfuric acid. Silicate of soda was made in 1890.

Aluminum Hydrate Marketed

Other processes and products were worked out and acquired. In 1896, having bought American rights to the Bayer process, aluminum hydrate was put on the market. Three years later, Merrimac, through the purchase of the works and business of William H. Swift & Company, East Boston, became manufacturers of acetic acid, insecticides, and dry colors. From a Russian company, the rights to the Tentelew System were acquired, and a contact unit for the production of sulfuric acid was erected and put into operation in 1907. During the World War, in alliance with the New England Gas & Coke Company, Merrimac erected a plant for the manufacture of phenol and the high explosives, picric acid and trinitrotoluol. Operations on a large scale were continued until the close of the war.

Merrimac's destinies during the World War were in the hands of a farsighted, quiet-spoken, capable New Englander of faultless chemical heritage. 'Way back in 1787, through the General Court of Massachusetts, Caleb Wilder and his associate William Forbisher had patriotically made available to their fellow citizens certain improvements which they had perfected in the processes of what was New England's first important chemical industry, the production of pot-ashes. Caleb's great grandson, Salmon W. Wilder, having graduated with the very first class in chemical engineering at the Massachusetts Institute of Technology in 1891, had joined the Merrimac staff in 1897. In 1899, he had been made manager; in 1903, treasurer; in 1906, president, a post he filled till 1928 when he became chairman.

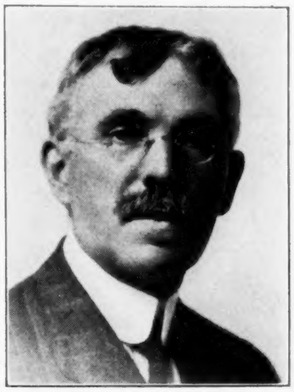
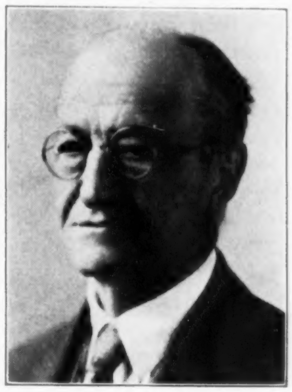
Merrimac Acquires Cochrane in 1917

At the time of his death, Mr. Schlesinger was the largest single shareholder in the company, and Mr. Wilder with William A. Russell, of The Russell Company of Boston, bought this stock and with it control. It was in the midst of bustling war activities, under Mr. Wilder's leadership, in 1917, that the Merrimac Chemical Company took over the Cochrane Chemical Company.

Though technically a purchase, this transaction became in reality a fusing of the two leading chemical companies of New England. The personnel of the consolidated operation reveals how intimate was this amalgamation. Mr. Wilder remained president, but the two chief plant executives of Cochrane, Frank G. Stantial and James Lund, became vice-presidents, and the Cochrane treasurer, Mr. Loring, served Merrimac in the same capacity.

There is much that is distinctively of New England in the birth, the growth, the merger of these two old New England chemical companies. Their makers were New Englanders or true adopted sons of New England, men connected with old, prominent Bay Colony families with traditionally important financial and industrial connections. Each company was initiated in direct response



Left to right, four executives of the Cochrane Chemical Co. C. Robert Gyzander, chief chemist, 1882-1917; *William J. Webber, in charge sales and purchasing,* 1872-1915; *James Lund and Frank G. Stantial, right, works managers, Cochrane Chemical Co., respectively* 1884-1917 *and* 1882-1917. *Mr. Stantial also vice-president, Merrimac,* 1917, *to date.*

to the demand of New England industries for chemicals, and their development was predicated upon the widening use of chemicals within a limited area. In this field they gained a dominating supremacy. This they held against vigorous competitive invasions of their territory. Yankee-wise, they grew slowly and surely, product after product, plant after plant. Both companies, since their incorporation, have never failed year in and out, throughout booms and depressions, to earn a dividend on their stock. There are customers on the books today whose active accounts go back through three generations and in both plant and office there are grandsons of men who worked with the makers of Merrimac.

Left, Cochrane plant at Everett, Mass., 1890. *Right, original plant at Malden,* 1860.

Determining Color Standards

By Herbert L. Freet

When Europe went marching off to war in 1914, our textile industrialists were cut off from their accustomed supplies of dyestuffs, and America suddenly found herself independent of European color styles. In 1915, the Textile Color Card Association was organized to simplify color selection and use. Silk industries were the first to subscribe, and American dye makers, just then coming into production, helped push the movement. Woolens and cottons soon fell in line, followed shortly by the millinery trade. Gradually, tanners, glove makers, producers of automobile accessories, and paper makers placed their color problems in the Association's hands, so that today, the word "Textile" is a misnomer Many industries subscribe to these truly American color standards.

The work of the Association embraces a yearly cycle in which dye makers, tanners, and fashion each plays a part. The Association simplifies the work of the many dye producers and consumers. Each color, when finally selected to appear on an Association color card, is given a name and a number. Samples are then produced on a representative grade of silk or wool and are sent to all members. The Association makes no attempt to advise dye makers on how to produce these colors. However, orders are generally placed by number, and the dye maker needs only to refer to his formula for this particular number in order to produce exactly the shade and quantity the customer desires. Thus the Association forms an important bond of understanding between dye manufacturers and their customers.

Textile colorists find their work simplified considerably by the Association. The ease with which they may obtain the exact shade they want and the knowledge provided them as to what color to use for their fabrics is of inestimable value. Since the Association is virtually the high tribunal of color style, textile producers know that their color selection will find a receptive market with the clothing makers who form another important link in the chain of Association members. Fashion experts from the many different fields are coordinating color styles. Through the Association, shoe manufacturers and scarf makers stand on common ground of color with hat makers and textile fabric producers.

The Association confers separately with members of each industry on plans for the coming year. Colors are suggested, discussed, and finally included on a color card. These color cards are distributed to all members and are used throughout the year. Certain color cards have been long accepted as standard, but periodically, the Association will make up separate cards containing colors of a definite type or tint. Margaret Hayden Rorke, managing director, has inspired many such cards, and the members rely on her choices.

At present, Miss Rorke holds two meetings with each industry each year. The first meeting is for those interested in volume production. Owing to severe production schedules, these concerns must make their seasonal color choices considerably in advance. These first meetings are followed by meetings of members interested in what Miss Rorke terms "the novelty trend." Thus, the Association's work closely parallels each industry's production schedule. Last year, another set of meetings was included, designated as "retail trade clinics" where suggestions are in order and better cooperation won from retailers.

The Association has developed the U. S. Government Official Color Card, working with the Federal Specifications Board which sets the standards for flags, uniforms, filing paper and what not.

Association members are represented in 27 foreign countries. The Department of Commerce distributes Association cards all over the world, and all American consuls have them on file. Thus, a world wide export business is carried on with these color cards serving as a guide.

The Association is supported entirely by subscription from member firms. Each year sees new subscribers in widely varied fields until today, the Association has nearly 1200 domestic and foreign members.

Zinc as a Chemical Raw Material

Part II

By Bruce R. Silver

Manager, Technical Service, The New Jersey Zinc Co.

SOREL and LeClair in France started experiments in 1834 which led ultimately to the commercial production of zinc oxide. By 1841 the manufacture was well established at Grenelle, France. The oxide was first made by burning the metal in air and this method is still known as the French process. The first production in the United States was by The New Jersey Zinc Company in Newark, N. J., in 1852. The oxide, however, was made directly from ore and this method has been designated as the American Process. George H. Cook, State Geologist of New Jersey, estimated the total U. S. production in 1867 as 10,000 tons. Sales of zinc oxide during the past 20 years are given in Table 4, together with exports, imports and indicated domestic consumption.

Prior to 1931, data showing the distribution of sales by industries are not available, but it is believed that the rubber industry during the previous 20 years accounted for 50 to 60 per cent. of the total consumption, with the other industries following in the order shown in Table 5.

Zinc oxide functions in rubber as an activator of organic accelerators, and as such is a constituent of practically every modern rubber compound. It also exerts a physico-chemical effect in that it reinforces rubber compounds; *i.e.*, it improves such physical properties as tensile strength, abrasion and tear resistance. It also imparts to rubber resistance to heat and aging. In paint, lacquer, printing ink, etc., in addition to its properties as a pigmentive agent, it reacts with the vehicles promoting hardening and drying. It is also effective in promoting color retention. In floor covering, including oilcloth and linoleum coverings, it functions in a similar manner as in paints. In the textile field, it is used in discharge printing; in ceramics, largely as a flux, and to a certain extent as an opacifying agent. Zinc oxide is employed as a chemical raw material in the manufacture of other salts of zinc, some of which are used in considerable tonnages, such as the soaps of stearic and lauric acids; the chromates; zinc meta arsenate; as a timber preservative, and the zinc salts of

Table 4—Sales of Zinc Oxide in the U. S.

(Tons of 2,000 pounds)

	Zinc Oxide	*Leaded Zinc Oxide*	*Total Zinc Oxide*	*Imports*	*Exports*	*Apparent U. S. Consumption*
1914	82,809	11,317	94,126	2,629	15,592	81,163
1915	109,261	18,758	128,019	882	19,989	108,912
1916	100,339	23,003	123,342	447	13,942	109,847
1917	107,586	23,450	131,036	119	15,446	115,709
1918	100,286	26,714	127,000	162	12,421	114,741
1919	117,639	27,591	145,230	105	14,703	130,632
1920	99,444	30,460	129,904	1,445	11,164	120,185
1921	74,329	16,103	90,432	1,343	2,511	89,264
1922	128,465	9,613	148,078	2,754	3,977	146,855
1923	126,987	23,504	150,491	1,125	5,024	146,592
1924	131,470	26,729	158,199	1,813	3,927	156,085
1925	151,354	31,750	183,104	1,406	10,855	173,655
1926	146,923	23,859	170,782	1,221	14,661	157,342
1927	151,246	26,064	177,310	1,476	14,494	164,292
1928	160,904	24,223	185,127	1,455	14,799	171,783
1929	160,611	27,149	187,760	1,377	17,638	171,499
1930	119,142	17,279	136,421	1,135	10,753	126,803
1931	95,700	18,577	114,277	1,457	5,131	110,603
1932	72,250	14,305	86,555	2,672	1,261	87,966
1933	98,542	22,868	121,410	2,541	722	123,229
1934	87,088	20,506	107,594	1,267	1,155	107,706

(Source U. S. Bureau of Mines)

The Belgian retort reduction furnace for metallic zinc.

organic compounds for rubber acceleration. A substantial quantity is used directly in cosmetic and pharmaceutical preparations.

Table 5—Sales of Zinc Oxide by Uses, 1931-32-33-34

Zinc Oxide	1931	1932
Rubber	47,972	37,679
Paints	31,357	22,369
Floor Coverings and Textiles	4,695	2,837
Ceramics	3,171	1,782
Other	8,505	7,583
	95,700	72,250
Leaded Zinc Oxide		
Paints	18,292	14,072
Rubber	38	26
Other	247	207
	18,577	14,305
Zinc Oxide	1933	1934
Rubber	53,869	50,145
Paints	29,218	23,741
Floor Coverings and Textiles	4,087	4,781
Ceramics	2,639	2,963
Other	8,729	5,458
	98,542	87,088
*Leaded Zinc Oxide**		
Paints	22,488	20,376
Rubber	46	28
Other	334	102
	22,868	20,506

* Zinc oxide containing 5% or more lead is classed as Leaded Zinc Oxide.

Lithopone is a white pigment consisting of zinc sulfide and barium sulfate in approximately equimolecular proportions (30:70%). It is produced by the co-precipitation of zinc sulfate and barium sulfide. The process was invented in England by Orr in 1874. Lithopone was first produced in the United States by Cawley, Clark & Co. at Newark, N. J., in 1903, using a process invented by Griffith in 1877. In 1906, a total production of 4,300 tons was reported. Domestic sales, imports and exports and apparent domestic consumption are shown in Table 6, for the period 1914-1934.

Table 6—Lithopone

(Short Tons)

	Domestic Sales	*Imports*	*Exports*[1]	*Apparent U. S. Consumption*
1914	32,819	4,036	....	36,855
1915	46,494	2,126	....	48,620
1916	51,291	2,341	....	53,632
1917	63,713	224	....	63,937
1918	62,403	....	....	62,403
1919	78,365	739	....	79,104
1920	89,373	1,714	....	91,087
1921	55,016	5,247	....	60,263
1922	83,360	10,763	1,616	92,507
1923	98,199	10,440	1,485	107,154
1924	109,469	6,830	923	115,376
1925	145,019	6,330	1,287	150,062
1926	159,931	8,686	1,941	166,676
1927	176,994	7,979	2,110	182,863
1928	200,468	9,885	3,326	207,027
1929	206,315	8,409	4,556	210,168
1930	164,065	7,018	3,665	167,418
1931	151,850	5,674	3,821	153,703
1932	121,667	4,724	1,261	125,130
1933	140,831	5,596	1,186	145,241
1934	145,565	3,927	2,401	147,091

[1] Not classified separately prior to 1922.
Source—Mineral Resources of the U. S., and Mineral Year Book.

The distribution of lithopone for the years 1933-1934 was as follows:

	1933	1934
Paint, Varnish and Lacquer	106,995	114,472
Floor Coverings and Textiles	18,472	14,811
Rubber	5,078	4,596
Other	10,286	11,686
	140,831	145,565

Lithopone is used in all of the above applications primarily on account of its action as a pigment of high hiding power, due almost entirely to the zinc sulfide constituent. In recent years, a marked demand for pigments of higher tinting strength and hiding power has led to the production of "high strength" lithopones containing 50-55 per cent. of zinc sulfide. The tonnage of these latter products is included in the total lithopone figures reported by the Bureau of Mines. The actual equivalent normal lithopone consumption is therefore somewhat greater than indicated. In addition to the extra strength lithopones, a growing amount of technically pure zinc sulfide is being used, but the consumption figures are not available.

Zinc Chloride

The sales of zinc chloride and apparent consumption for the period 1919-1934 are given in Table 7. Its principal uses are in wood preservation, the manufacture of hard fiber, and oil refining, which reached a peak in 1920, and registered severe declines during

the depression period. This is due to the substitution of cheaper materials such as creosote for wood preservation and the decline in the use of hard fiber.

Table 7—Zinc Chloride 50° Bé.

Short Tons

	Sold by Domestic Manufacturers	*Imports*	*Apparent Consumption*
1914	(a)	....	.....
1915	(a)	....	.....
1916	(a)	2	.....
1917	(a)	2	.....
1918	(a)	98	.....
1919	59,228(b)	1	59,229
1920	68,945(b)	565	69,510
1921	59,457	2,199	61,656
1922	41,627	1,374	43,001
1923	42,431	551	42,982
1924	51,054	319	51,373
1925	45,619	469	45,088
1926	47,296	568	47,864
1927	40,141	470	40,611
1928	45,669	563	46,232
1929	43,189	638	43,827
1930	29,043	351	29,394
1931	34,885	278	35,163
1932	23,524	251	23,775
1933	32,187	556	32,743
1934	17,555(c)	382	17,937

(a) Figures not available.
(b) Production. Not sales.
(c) Preliminary figures.
Note: No exports listed.

Sales of zinc sulfate from 1919, when they were first separately recorded, to 1934 are shown in Table 8. The principal use is in the manufacture of lithopone, but the amount so used does not appear in the figures below since it finally appears as a zinc product. Other important uses are as a mordant in dyeing, in the rayon industry, agricultural sprays, etc.

Table 8—Zinc Sulfate

Short Tons

	Sold by Domestic Manufacturers	*Imports*	*Apparent Consumption*
1914	(a)	....	.....
1915	(a)	....	.....
1916	(a)	(c)	.....
1917	(a)	(c)	.....
1918	(a)	....	.....
1919	2,763	(c)	2,763
1920	3,072	50	3,122
1921	3,295	17	3,312
1922	5,078	17	5,095
1923	5,375	20	5,395
1924	4,674	13	4,687
1925	5,593	17	5,610
1926	6,612	66	6,678
1927	6,418	205	6,623
1928	4,733	683	5,416
1929	7,454	909	8,363
1930	6,249	519	6,768
1931	5,290	208	5,498
1932	4,252	131	4,383
1933	5,698	84	5,782
1934	6,783(b)	139	6,922

(a) Figures not available.
(b) Preliminary figures.
(c) Less than 1 ton.
Note: No exports listed.

Zinc is usually sold directly by the producer to the manufacturer. The price basing point is East St. Louis since the Tri-state ore fields and several large smelters are located near that point. The base price is Prime Western grade. Most of the zinc, however, is sold in New York and consumed at points quite distant from St. Louis. The New York market is the St. Louis price plus 35 cents per 100 pounds, the freight rate on slab zinc from St. Louis. The market is determined by the private transactions of producers and consumers, and a representative price is reported daily in the metal trade papers.

Marketing Zinc Products

High grade zinc is usually sold at a fixed differential over the Prime Western market. Contracts are written for a given period calling for shipment in approximately equal monthly quantities. Prices are determined monthly, based on the average price of Prime Western metal for the month next preceding date of shipment, as reported in the *Engineering and Mining Journal.* High grade metal is usually sold f.o.b. smelter, with freight allowed to the customer's plant. Annual extreme and average prices of Prime Western Zinc for the past 20 years are shown in Table 9.

Table 9—Zinc Prices in East St. Louis

Annual extreme and average prices of Prime Western slab zinc, East St. Louis, compiled from quotations published daily in *American Metal Market.*

Year	*High*	*Low*	*Average*
1914	6.00	4.60	5.11
1915	27.00	5.55	14.16
1916	21.00	8.20	13.57
1917	10.87½	7.50	8.93
1918	9.50	6.62½	8.04
1919	9.00	6.00	7.04
1920	9.50	5.50	7.77
1921	5.60	4.12½	4.67
1922	7.35	4.47½	5.74
1923	8.00	5.75	6.66
1924	7.85	5.65	6.35
1925	8.90	6.75	7.66
1926	8.75	6.70	7.37
1927	7.00	5.60	6.25
1928	6.35	5.40	6.03
1929	6.80	5.45	6.49
1930	5.45	3.95	4.56
1931	4.12½	3.12½	3.64
1932	3.50	2.30	2.88
1933	5.00	2.55	4.03
1934	4.40	3.67½	4.16

Ten-Year Averages:............1905-1914 .... 5.66
1915-1924 .... 8.29 1925-1934 .... 5.31

Under normal conditions the domestic zinc market is independent of the world market. Practically all the metal is sold for domestic consumption and foreign metal is subject to a duty of 1¾ cents per pound. The United States is normally at a disadvantage in competition with British and Continental producers on account of freight rates and higher labor costs.

Rolled zinc is sold in accordance with a list of extras for gauge, width, etc., which is generally used by the industry. A base price is published daily in the *American Metal Market*. Sales are usually made against definite quotations, although some contracts are written for a period not exceeding three months. Zinc dust is also sold on the basis of a differential over the Prime Western market.

Zinc oxide and lithopone are generally sold on a contract basis for a period of 6 months at a specified price, f.o.b. producer's works, with freight allowed to destination. The prices for those products have been substantially constant for considerable periods and bear no direct relationship to the zinc metal market. The domestic market for zinc oxide and lithopone is protected by a duty of 1¾ cents per pound. The price changes during the past 20 years for zinc oxide and lithopone are given in Table 10.

Percentage of Export Business

It will be noted from the sales of zinc oxide (Table 4) that the export market in past years has represented a substantial proportion—approximately 10 per cent. of the total business. Exports went principally to Canada and Great Britain. This market suffered a considerable decline beginning in 1931 when there was a substantial increase in production facilities in the United Kingdom. Very low prices abroad and an unsettled foreign exchange situation also had an adverse effect. The Canadian duty on United States imports of zinc oxide was increased about 1931 from 5 per cent. to 15 per cent. The imports of lithopone, principally from the Netherlands, have always exceeded exports, the latter going almost entirely to Canada. Lithopone is protected by a duty of 1¾ cents per pound.

Table 10—Zinc Oxide and Lithopone Prices

(Carloads)

Year	*Zinc Oxide*	*Lithopone*
1914	5¼c per lb.	4c per lb.
1915	6c	4¾c
1916	9c	7¼c
1917	10c	6c
1918	10⅛c	7c
1919	8⅞c	6⅞c
1920	9½c	7¾c
1921	8c	6½c
1922	7c	6½c
1923	8c	7c
1924	7⅞c	6½c
1925	7½c	6c
1926	7¼c	5⅝c
1927	6½c	5¼c
1928	6½c	5¼c
1929	6½c	5¼c
1930	6½c	4½c
1931	6½c	4½c
1932	5¾c	4½c
1933	5¾c	4½c
1934	6½c	4½c

For 1933 and 1934, the average price of zinc chloride (50° Baume) was $45 per ton. The average price of zinc sulfate in 1933 was $39 per ton and in 1934 was $42 per ton.

Exchanges and Associations

Facilities are available on the New York Metal Exchange for trading in metallic zinc futures, but comparatively little interest is shown in this market.

The American Zinc Institute was organized July 29, 1918, by a group comprising all phases of the zinc industry, including mining, smelting, rolling zinc, and the manufacture of zinc pigments and salts. The headquarters are in New York, in charge of a secretary, who devotes his full time to the activities of the association. The objects of the Institute as outlined at the time of organization are as follows:

(1) "To educate the public in new uses for zinc."

(2) "To establish a statistical bureau."

(3) "To suggest improvements in the organization and management through the adoption of advanced methods."

(4) "To promote sound, economic conditions in the industry. . . ."

An interesting recent activity of the Institute has been directed toward securing better quality galvanized corrugated and sheet steel for buildings, etc. As a result, a number of manufacturers have placed on galvanized sheets the American Zinc Institute "Seal of Quality," guaranteeing a coating of 2 oz. of zinc per square foot. The program also includes the education of consumers of these products to demand sheets of this quality.

Known ore reserves are adequate to take care of the zinc requirements of the world for a long period. Uses as a metal, on account of zinc's comparative economy and unique chemical and physical properties, may be expected to increase. The established applications in galvanizing, brass making and rolled zinc may be expected to maintain their position. The most hopeful outlook in the industry is the widening application of zinc die casting alloys.

In the case of zinc oxide, practically every application involves the question of volume cost, and during the past several years every effort has been made to displace it with cheaper materials. For example, in 1915, approximately 50 pounds of zinc oxide were used for every 100 pounds of crude rubber consumed; in 1929, this proportion had been reduced to approximately 13 pounds per hundred; and in 1935, to 10 pounds per hundred.

The use of normal lithopone may be somewhat affected by a trend toward pigments of greater hiding power such as the higher strength lithopones, pure zinc sulfide, and the more recently developed titanium pigments. The restoration of the market for zinc chloride to its former position seems doubtful for economic reasons. The use of zinc sulfate appears to be reasonably stabilized, with some promise of improvement.

Petroleum Thinners vs. Turpentine*

By J. W. Brock

Paint and Varnish Division, Canadian Industries, Ltd.

THE petroleum solvent which is most directly considered in this comparison is the one with rate of evaporation and drying closest to that of turpentine itself. In the development of paints there has been the supplementary development of better solvents and thinners, so that petroleum thinners offered to-day vary considerably from the fractions that were marketed by the refining industry when thinners were only by-products and somewhat of a nuisance.

A kerosene, free from sulfur and containing no non-evaporating mineral oil, is one of the highest boiling fractions used by the paint industry, while benzine or painters' naphtha is at about the other end of the scale. Benzine generally evaporates too rapidly for most brushing products, and an intermediate fraction with an evaporation rate similar to turpentine is most widely used.

Petroleum solvents vary considerably, depending upon the source of the crude and the refining methods. While thinners with solvent power higher than turpentine can be produced, this does not apply to the average run of petroleum solvents for which no special claims are made. These materials, however, have sufficient solvent power for oil paints or ester gum or rosin-chinawood oil varnishes. The better the ability of the solvent to disperse the solid material of a paint composition within itself and hold it there, the more stable will be the solution.

Turpentine is less stable than good grades of petroleum solvent. Its odor was at one time the hall-mark of a good paint, but in competition with other products this pungent and lasting smell is now frequently a disadvantage. When exposed to air, turpentine appears to evaporate completely under a filter paper test, but with more accurate methods, it may be found that a slight amount of an oxidation product of turpentine remains. About one part in one hundred of turpentine is converted into sticky, resinous material. Much of the success of turpentine as a thinner may be attributed to its even rate of evaporation, and to its possession of a very suitable solvent power. Turpentine has sufficient solvent power to disperse the paint ingredients but insufficient solvent action to attack the dried film of the first coat when the second coat is applied. Many stronger solvents cannot be used because of their dissolving or swelling action on the films of dried paint.

One distinct advantage of turpentine over the petroleum solvents has been the fact that the term usually is applied to a very definite material, while, as stated above, petroleum thinner and similar terms may be applied to a wide range of products. The manufacturer may buy petroleum solvents to specification, but the reason he generally recommends turpentine for further reduction of mixed paints is because he will then know definitely what the painter will use. It is a mistake to speak of petroleum thinner as turpentine substitute, because each has its own merits. On the other hand, there are blends of solvents, such as a mixture of tetralin, white spirit and pine oil, which are close physical imitations of turpentine and perhaps deserve the term substitute.

Turpentine and petroleum thinners are, of course, volatile ingredients in the paint. Their evaporation is the first stage of the drying process and gives the paint a preliminary set. If the thinner evaporates slowly, there may be overlapping between its evaporation and the final setting of the paint film through the oxidation of the drying oils. The chief function of the volatile ingredients is to thin the paint to a low consistency to facilitate the spreading of a thin, uniform coating by brush or spraying. The thinner should really be counted in the cost of application, as it is of no concrete value to the final consumer. In 99% of all painting it is wasted, and only in a few industrial installations are provisions made for thinner recovery.

Thinner is especially necessary in the reduction of viscosity of flat wall finishes, and it is sometimes said that turpentine assists in producing the desired flat effect. This is not true, as the flat effect depends primarily upon the high ratio of pigment to solid binder or vehicle and the thinner evaporates, leaving this pigment vehicle ratio undisturbed. In addition to reducing consistency, the thinner must serve to dissolve or disperse all the ingredients to form a stable dispersion. It must be non-poisonous and evaporate at a sufficiently even rate to avoid setting-up of film stresses. The rate of evaporation must not be high enough to cause poor brushing, nor the flash so low as to be hazardous; and the odor must not be disagreeable.

The ultimate effect of the thinner upon the durability of the paint film is a matter of the most fundamental importance. Dr. F. L. Browne, of the Forest Products Laboratory of the U. S. Department of Agriculture, states that the solvent theory, which attributes better wood penetrating powers to turpentine-thinned paints, is erroneous. Paint liquids penetrate the summer woods more readily than the spring woods upon which the paint film lasts longer. The alleged drying action of turpentine is not supported experimentally, and the claim that the non-volatile residue of turpentine adds to the durability of the film is doubtful, because of the small amount of residue left by fresh turpentine. Only old oxidized turpentine should prove materially better than petroleum spirits in this respect.

Some tests have been conducted upon the effect of various thinners on the outdoor durability of a straight white lead paste paint and a lead zinc extender prepared paint. Four turpentines from different sources, one of which was old and slightly oxidized, four mineral spirits from different sources of crude oil, one benzine and one coal tar naphtha, were used in the preparation of each paint. All the thinners used were up to specification. The differences in serviceability of the coatings, that might be attributed to the kind of thinner used, were too small to have any bearing on painting practice. The white lead paint, which was thinned with oxidized turpentine, started to show the typical failure later than the paint thinned with any of the other turpentines or mineral spirits, but the ultimate durability was not affected. The paints thinned with thinners other than turpentine showed a slightly higher spreading rate, while those thinned with turpentine displayed better suspension properties. With oxidized turpentine, still better suspension was obtained, and the coating appeared more continuous and smoother than with any of the other thinners. Apart from the better appearance with oxidized turpentine, no other difference in appearance was apparent among the paints thinned with the various solvents.

Turpentine apparently has advantages over petroleum and other thinners in proportion to its oxidized content. This suggests the addition of specially oxidized turpentine to paint as a film-forming ingredient, and this matter is being investigated.

Some of the newer paints, and more particularly a number of interior enamel finishes, require a thinner of greater solvency than ordinary mineral spirits or benzine and will dry flat if these solvents are used. Turpentine or specially-blended thinners containing coal tar solvents or specially-treated petroleum solvents will prove satisfactory for these finishes, although there is some danger of the petroleum or coal tar thinners lifting the

* An address before International Convention of Master Painters, Toronto, 1935, digested from *Canadian Chemistry and Metallurgy.*

first coat on the second application. Turpentine generally has sufficient solvent power to dilute these products, even while it may not serve for their manufacture.

A good grade of petroleum solvent may be used to thin most oil type products, and in rooms where the maintenance of a desirable atmosphere is important it has definite advantages. However, where there is doubt concerning the nature of the material to be thinned, it is well to consult the manufacturer, or to revert to the turpentine thinner which will not throw ingredients out of solution and which has superior wetting powers that result in somewhat better paint film adhesion. Turpentine also has a slight advantage in reducing paste paints, where basic pigments such as white lead are used, because it has a faster and better dispersing action on the soaps contained in these pastes, resulting in a smoother final product.

Bleaching Glues and Gelatins

In bleaching and clarifying glues and gelatins, sulfurous acid remains the agent chiefly employed, although other processes are gradually developing in importance. An author in *Gelatine-Leim-Klebstoffe*, Nov.-Dec., '35, points out that the property possessed by nitrogenous organic tissues of adsorbing sulfur dioxide is retained to some extent by the glues and gelatins, and consequently in the final drying of these products the sulfur dioxide is not completely lost. *The Chemical Trade Journal*, in reporting this, states that for efficient bleaching with sulfurous acid, not only is a moderate excess of the reagent necessary, but the solution should be warm, neither of which steps is particularly favorable to the quality of the glue or gelatin. A glue with acid reaction is undesirable if it is eventually to come into contact with papers printed with colors which are not fast to acid. In any case, a sample of glue with a markedly acid reaction should be rejected. Bleaching is usually effected in the concentrated liquor stage, the liquors being treated in wooden vats or in lead-lined iron vats provided with a coil for heating and cooling, and with a second perforated coil whereby the sulfur dioxide can be introduced. With the general availability today of liquid sulfur dioxide, and the consequent ease offered for the control of the process, few glue and gelatin manufacturers prepare their own sulfur dioxide by the burning of sulfur.

Introduction of Hydrogen Peroxide

Since bleaching with sulfurous acid is effective only in acid solution, and since many hide glues are to be marketed as free from acid, or even in the alkaline state, hydrogen peroxide has been frequently used in the process. In this case, also, the bleaching should be effected in wooden or lead-lined vessels and with the addition of ammonia, since the peroxide is only effective in alkaline solution. Warming and stirring is also necessary in the peroxide process. Sodium hydrosulfite is also being employed as a glue-bleaching agent, but, as stated above, the majority of works continue to rely upon sulfur dioxide.

The liquors, either from hides or from bones, contain suspended fine material consisting of undissolved organic matter, albumens and mucins, lime soap and grease, hair and mineral particles of fragments of bone. In many plants, glue liquors are clarified by standing in tanks kept warm by steam coils when the dirt settles and the grease that comes to the surface is skimmed off. Certain glue liquors can be filtered fairly readily. In other cases filtration is only practicable with filter media such as Fuller's earth, charcoal, alumina, and particularly with loosely packed cellulose, gravity filters, not filter presses, being employed.

Many manufacturers prefer precipitating the suspended material by producing a colloidal coagulation in the glue liquor, which can collect and hold the suspended particles. In many cases the coagulant is a solution of alum or aluminum sulfate. The former reacts with the aqueous solution of chondrin (always present in concentrated glue liquors), giving a voluminous white precipitate which has a clarifying action. The use of alum or aluminum sulfate is not practicable where the highest quality glues are to be produced, for the products obtained with aluminum salts possess lower swelling and adhesive powers, and less elasticity than glues by other processes.

Albumen is another favorite material, being added to a comparatively cool liquor, and the temperature gradually raised until coagulation takes place. For pale gelatin, egg-white albumen is employed. For glues, the requirements as to which are not quite so rigorous, blood is frequently used. A clarification agent which is cheap and which can be used safely is mono-calcium-phosphate. This material is effective in slightly acid solutions. If the original solution is alkaline, it should be made acid, preferably with phosphoric acid. The phosphate is added to the glue liquor at 60° to 70° C. The liquor is then treated with milk of lime, the precipitate of dicalcium phosphate carrying down with it the whole of the impurities. Care should be taken to avoid an excess of milk of lime, while the mono-calcium phosphate should be as free as possible from other soluble salts or organic impurities.

The occasional addition of other materials to glues or gelatins to improve their appearance is also noted. In the case of gelatin, glycerin is occasionally added to improve the elasticity. Glues are occasionally subjected to what is really sophistication. Cases have been encountered in which appreciable quantities of dextrin, casein, etc., have been found; while in some instances white lead, lithopone, or blanc fixe have been added to glue before solidification with a view to improving its final appearance, the object being to give the usual brown clear bone-glue the appearance of skin-glue. The ash content of glue should, provided no extraneous additions have been made, not exceed 2 to 3 per cent.

Textiles

Celliton Fast Blue FFB, released by General Dyestuff, possesses a very clear shade and excellent leveling properties with the great advantage of dyeing evenly with yellows and reds or other Celliton colors from any length of liquor.

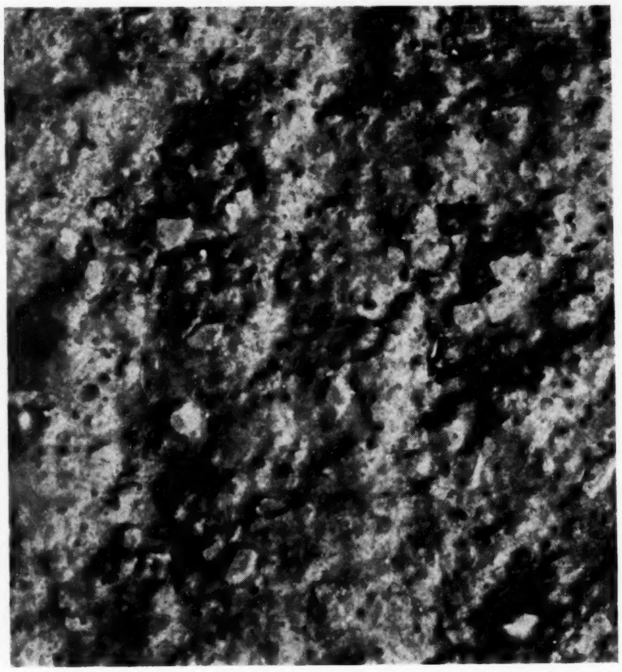
Dyestuffs Division, du Pont, announces the following: Luxol Brilliant Green BL (patented), a new spirit soluble color yielding bright bluish shades of green in all types of spirit printing inks. Possesses excellent solubility in alcohol, and is also fast to light, exhibiting good tinctorial strength. It is expected to find use wherever a quickly drying, bright printing ink of bluish green shade is desired. Diagen Black DM (patented) fills the need for a straight azoic black to be used alone for greenish shades of black or in conjunction with other colors of this type. It is particularly useful for shading blues to obtain dark navies and as a shading component for browns. Exhibits satisfactory fastness to light and to soaping at the boil for one-half hour, and can be used on the less expensive types of cotton goods because of its desirable shade and good application properties. Avirol OS and Avirol WS (patents applied for) are new emulsifying agents, suitable for a wide variety of uses. The former is an oil-soluble compound; the latter is wax-soluble. Both are described as being entirely stable to atmospheric oxidation. It is also stated they will not become rancid and exhibit excellent working properties. Avirol OS is for preparing emulsions of animal, vegetable and mineral oils, and Avirol WS adapts itself to the emulsification of paraffin wax, animal waxes such as beeswax and spermaceti, and vegetable waxes such as Carnauba and Japan wax.

Coatings

Cement-coated asphalt shingles, to be known generically as cementop shingles, are announced by Bakelite Building Products Co., Inc. By a new process, conventional asphalt shingles are given an extra surface coating of special formula hydraulic cement in which mineral oxide pigments are incorporated. These shingles have many distinctive advantages over ordinary asphalt shingles. The cement coating provides a vehicle for the incorporation of a variety of permanent colors not previously obtainable. A white siding material, so long needed, is now available. Coating also gives the shingles rigidity; acting as a shield protecting the asphalt beneath from the rays of the sun. These shingles also have better fire resistance, greater resistance to erosion, and greater insulation value. Because the cement coating imparts rigidity, a greater portion of each shingle butt can be exposed; fewer shingles being needed to cover a given area. Where an ordinary asphalt shingle can be exposed 5″, the cementop can be exposed 7″.

Silvered Celluloid

A high-grade transparent Celluloid composition which is chemically silvered to give beautiful mirror effects has been announced in Germany. Material can also be gilt; bronzed and dull lustrous effects may be obtained. Outlets are numerous, and such articles as buttons, combs, hair ornaments, hat ornaments, sign letters and picture frames, are only a few of the articles to which it can be suitably applied. In molding it is better to use electrical heat, being preferable to hot water heat, since the temperature should not be above 160° F.



Sample of new cementop shingles. Photograph enlarged eight times to show how thoroughly the coating covers the mineral granules of the asphalt shingle, thus shielding the asphalt beneath from the destructive rays of the sun.

Plastics

A new machinable plastic, "Ronyx," has been developed by the Resinox Corp. Company has made no formal announcement and is not yet prepared to state in what classification the material falls. It is understood that it is not a cast phenolic material. "Ronyx" is available in sheet form in a variety of colors and metallic tints, which latter have in some instances a pearlescent appearance. It is to be made in opaque form and will not be available in transparent forms. It is intended for use primarily as button material, or for such other products as can be produced readily from sheet stock.

Anti-Friction Molding Material

While standard phenolic molding compounds are fairly resistant to friction, there are applications where constant friction, plus impacts of varying degrees, requires material of greater resistance, such as cam parts, automobile door bumper shoes, builders' hardware parts, refrigerator latch bolts, machine parts in constant friction, etc. To withstand this friction, General Plastics has developed 1564 which combines both impact strength and friction resistance. It contains 10 per cent. graphite, and has an impact strength of roughly 40 per cent. greater than ordinary materials. Its most interesting use is the small bumper shoe which bears against the metal wedge on the new motor-car doors, supporting them and preventing rattling.

Fertilizers

A method of discovering the fertilizer needs of fruit trees quickly has been tested at the East Malling Research Station and results reported in *The Chemical Trade Journal.* A hole a quarter of an inch in diameter is bored through the trunk of the tree and a glass tube inserted at one end, made air-tight by a rubber collar fitting close to the bark. The other end of the hole is blocked by a rubber stopper. The glass tube is connected by a siphon to a container holding the liquid that is to be injected. As soon as the air is expelled from the hole, the apparatus is bound up to prevent leakage. In the experiments, a group of 21-year-old Cox's Orange Pippin trees were treated in June with a nutrient containing a quarter per cent. of phosphate of potash and a quarter per cent. of urea. Varying quantities of the solution were used, containing up to a sixth of a pound of each substance, equivalent to about 50 lbs. per acre. It was found that in summer each tree gets its fill of this "forcible feeding" in from one to three days. Results were interesting. Shoot growth on the treated trees was two or three times as great as that of a control group of untreated, and the increase varied in proportion to the quantity of nutrient used.

Miscellaneous

A new mineral pigment possessing excellent properties of shade and covering is described in *L'Industrie Chimique*, Dec. '35. Author finds that all lead chromate pigments are first precipitated as rhombic crystals, but pass, more or less completely, into the monoclinic form. The so-called sulfo-chromates are mixed crystals of lead chromate and lead sulfate. New discovery lies in the addition of lead molybdate, which crystallizes in the tetragonal system. When the chromate, sulfate and molybdate of lead are precipitated together in certain proportions, the whole precipitate finally passes into the tetragonal crystalline form and is of a scarlet red color.

Emulsifying Agent

Lemon juice, hydrogen peroxide, oxyquinoline sulfate and other materials difficult to hold in emulsion, can be easily incorporated into greaseless creams by an emulsifying agent recently introduced by Glyco Products. "Acimul" is a hard, wax-like solid, self-dispersible in hot water, forming stable creams or liquid emulsions according to the concentration. It also acts as an emulsifying agent for oils, solvents and waxes producing greaseless creams stable in acids, fruit juices, hydrogen peroxide, etc.

Skiing on Borax

Borax now finds use as a bona fide substitute for snow. Recently, Saks Fifth Avenue Store erected a ski run on its sixth floor so that city folk might practice here for their country week-ends.

Important New Organic Base

A stable, non-volatile organic base, "Triton B," is announced by Röhm & Haas Co. Company claims it is an organic base as strong as sodium hydroxide and possesses many unique properties. A new tetra-substituted ammonium hydroxide is now available in commercial quantities. A few suggested applications are: solvent for cellulose, dyestuffs, metals, metal oxides. For saponification of oils and fats, esters, gums, waxes. In the preparation of the Triton carbonates, phosphates, resinates, silicates, soaps, xanthates. For the synthesis of new accelerators, antioxidants, antiseptics, detergents, intermediates, pharmaceuticals.

Explosives from Corn

A sugar-like compound, from which powerful war explosives can be made, reported as "Inositol," is made from water in which corn is soaked in corn starch manufacture. Process developed at the University of Iowa.

Stearic Acid Pearls

"Pearlstearic," a new stearic acid in the form of miniature pearls or pellets, has been developed by Darling & Co. New type is free-flowing, easily applied to the rolls, melts into the mix and disperses quickly. Stearic acid in this form was developed to overcome some of the disadvantages of the cake form, which is wasteful and more difficult to melt, and the powdered form which usually clumps together into an unwieldy mass on the rolls, causing uneven distribution. Pearlstearic overcomes these difficulties as it is handy to weigh out, melts and dissolves easily, is uniform and economical to use.

Synthetic Wax

A high melting, synthetic wax, "Albacer," is being marketed by Glyco Products. Wax, M.P. 95-97° C., is hard, white and highly lustrous; non-toxic; odorless and tasteless. Insoluble in water, it dissolves hot in hydrocarbon and chlorinated solvents. Albacer can be melted with synthetic resins, mineral and vegetable oils and other waxes producing products with many interesting properties. It is absolutely free from paraffin wax, chlorine, phenol, sulfur and any harmful, corrosive or toxic substances and is recommended for polishes, cosmetics, paper and similar coatings, electrical insulation work, dental waxes, etc.

Accelerator and Antioxidant

Two rubber chemicals, one an accelerator, the other an antioxidant, have been introduced by the Rubber Service Labs. "El-Sixty," the accelerator, has been tested alone and in combination with activators, such as diphenylguanidine, and produces excellent results in practically all types of compounding. According to maker, it is of special interest in high clay stocks and should find good use in mechanical goods stocks. "Perflectol," the antioxidant, imparts excellent flexing properties to tire tread stocks, etc. It is superior in flexing value to company's regular antioxidants, such as Flectol B. It is about equal in aging qualities to antioxidants now on the market.

Illuminating Gas from Lignite

A report from Leipzig tells of a process that has been perfected by which 20 to 30 per cent. more illuminating gas of high heat value may be obtained from lignite than from a corresponding amount of ordinary gas coal, and at less cost.

Adhesive and Caulking Material

An adhesive and caulking material for the building trades, called "Plasoleum," has been made available by the Revertex Corp. of America. Base of the new product is Revertex, a 75 per cent. concentrated rubber latex, giving it the waterproofing qualities of rubber as well as its durability and resistance to temperature change. Plasoleum is mixed on the job in quantities sufficient for the required work so that waste is held to a minimum. It can be spread with a trowel in cold form. Combined with certain fillers, it makes an advantageous material as a filler for expansion joints in buildings and as a caulking material for window frames, etc. Other special uses include its adaptation as an adhesive for laying wood and wood block, linoleum, rubber, cork, and tile on concrete or steel, and for laying linoleum, wainscoting, tile, rubber and glass on concrete, wood, brick and plaster walls.

Glycerine in Alcoholic Beverages

The general knowledge that glycerine has a definite value as smoothing agent in alcoholic beverages was recently provided with a scientific basis in experiments carried out by the Miner Labs. Tests conducted under careful scientific control confirmed the widespread popular belief that glycerine has a "smoothing" effect when added to alcoholic liquors, especially those of high alcoholic content.

Manufacture Red Cedar Oil

In manufacturing red cedar oil by steam distillation of the sawdust, roots and stumps of virgin cedars, old fence rails, or house timbers are used, it is reported in *Industrial and Engineering Chemistry*. Virgin cedar is becoming very scarce.

Determining Amount of Fat in Soap

A suggestion from Germany tells of determining the amount of fat in soap by measuring its volume instead of weighing it and the accomplishment of this by converting the more or less solid layer of freed fatty acids into a completely liquid layer by adding a known amount of oleic acid. *The Textile Colorist*, p.30, states that the aqueous solution from which the fat was freed and the fatty layer is put into a flask with a narrow graduated neck, the fatty acids thereby being floated up into it and measured. By using care and considering the specific gravities of soap fats fairly accurate results can be obtained.

Cotton Seed for Motor Fuel

Cotton seed is the raw material for a new motor fuel developed by the Highways Commission of the provinces of Kiangsu, Tschekiang and Anhui, reports the *Chinese Economic Bulletin* and noted in *The Chemical Age*, Jan. 4, '36. Following encouraging preliminary experiments, the Commission has placed an order for a considerable amount of cotton seed with a view to large-scale manufacture.

Casein and Lactose from Milk

The extraction of casein and lactose from milk is described by J. Kato in the *Journal of the Japanese Chemical Society*, No. 4, 1934. Skimmed milk is submitted to electrolysis in a three-compartment dialyzer. The two end compartments are filled with water; one fitted with a carbon anode and the other with a brass cathode. On the anode side the membrane of the dialyzer is silk impregnated with chromated gelatin and loaded with copper ferro-cyanide. On the cathode side the membrane is a voile cloth impregnated in the same manner. These membranes oppose the passage of the lactose to the exterior cells. The acidity in the central chamber is controlled. Electrolysis is effected under a pressure of 100 volts, and with a current of 1 ampere. The calcium, magnesium, potassium, and sodium ions in the skimmed milk pass into the cathode chamber, while the chlorine, sulfate and phosphate ions pass into the anode chamber. As these ions are removed, the hydrogen ion concentration of the milk falls, and when the isoelectric point is almost reached the casein commences to coagulate. It is separated by filtration and contains very little mineral matter. The filtrate is a lactose solution, which also contains very small traces of mineral salts. By evaporation under vacuum and centrifuging, there is obtained a lactose that is almost chemically pure.

U. S. Chemical Patents

A Complete Check-List of Products, Chemicals, Process, Industries

Agricultural Chemicals

Production insecticide or fungicide solutions. No. 2,025,365. James W. Van Meter; one-half to G. Edward Fetters, both of Los Angeles, Cal.

Production of mixed fertilizers containing ammonium nitrogen and nitrate nitrogen. No. 2,025,915. Heinrich Tramm to Ruhrchemie Akteingesellschaft both of Oberhausen-Holten, Germany.

Production of mixed fertilizers containing ammonium nitrate and phosphate using ammonia, nitric acid, and phosphoric acid. No. 2,025,-916. Heinrich Tramm to Ruhrchemie Akteingesellschaft, both of Oberhausen-Holten, Germany.

Production fibrous vegetable mass having insecticide-rosin mixture distributed therein. No. 2,027,581. George H. Ellis, St. Paul, Minn., to The Insulite Co., Minneapolis, Minn.

Production fertilizer materials by ammoniation of organics. No. 2,027,766. Royall O. E. Davis and Walter Scholl, Washington, D. C.; dedicated to the free use of the Public.

Production phosphate fertilizer material. No. 19,825-reissue. Beverly Ober and Edward H. Wight to The Oberphos Co., all of Baltimore, Md.

Cellulose

Production of composition containing a cellulose derivative and a cyclic ether. No. 2,025,044. Henry Dreyfus, London, England.

Production cellulose composition containing a cellulose derivative and a carboxylic acid ester of lauryl ether of a polyhydric alcohol as plasticizer. No. 2,025,048. George De Witt Graves to E. I. du Pont de Nemours & Co. both of Wilmington, Del.

Production cellulose sulfuric acid by reacting cellulose with pyrosulfuric acid in presence of a tertiary amine. No. 2,025,073. George W. Rigby to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production fibrous cellulose mass. No. 2,025,283. Walter F. Hoffman, Cloquet, Minn., to Cellovis, Inc., Chicago.

Process inhibiting distortion of regenerated cellulose film. No. 2,025,-376. Clarence E. Coleman, Buffalo, N. Y., to Du Pont Cellophane Co., Inc., N. Y. City.

Production cellulose derivatives. No. 2,025,660. Robert Haller, Riehen, near Basel, and Alphonse Heckendorn, Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Method stabilizing organic esters of cellulose. No. 2,025,939. Camille Dreyfus, N. Y. City, and Clifford Ivan Haney, Drummondville, Quebec, Canada, to Celanese Corp. of America, a corp. of Del.

Production cellulose derivative composition containing acetate and a metallic salt of a naphthenic acid. No. 2,025,957. George Schneider, Montclair, N. J., to Celanese Corp. of America, a corp. of Del.

Method treating cellulose with active chlorine to about ½ to ¾ bleach. No. 2,026,068. Emil Scheller, Lorsbach-in-the-Taunus, Germany, to E. I. du Pont de Nemours & Co., a corp. of Del.

Method improving electrical characteristics of cellulose insulating material. No. 2,026,316. Girard T. Kohman, West Orange, N. J., to Bell Telephone Laboratories, Inc., N. Y. City.

Process of partially de-esterifying acetone soluble cellulose acetate-propionate. No. 2,026,583. Carl J. Malm and Charles L. Fletcher to Eastman Kodak Co., all of Rochester, N. Y.

Production cellulose bulking agent. No. 2,026,865. John Campbell and Robert G. Quinn, Glens Falls, N. Y., to International Paper Co., N. Y. City.

Production high viscosity mixed esters of cellulose. No. 2,026,986. Carl J. Malm to Eastman Kodak Co., both of Rochester, N. Y.

Production composition comprising cellulose derivative and oily reaction product of polycarboxylic acid with hydrogenated castor oil. No. 2,027,466. Merlin Martin Brubaker to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production laminated sheet containing inner stratum of organic cellulose ester. No. 2,027,688. Max Hagdorn, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Production stiffening material using cellulose derivative in precipitated form. No. 2,027,957. Earle H. Cameron, Caldwell, N. J., to The Celastic Corp., Wilmington, Del.

Coal Tar Chemicals

Production 2-aminoanthraquinone-sulfonic acids. No. 2,025,169. Georg Kranzlein and Martin Corell, Frankfort-am-Main, and Wilhelm Schaich, Bad Soden-am-Taunus, Germany, to General Aniline Works, Inc., N. Y. City.

Production 2-amino-3-bromo-anthraquinine-sulfonic acid and the alkali metal salts thereof. No. 2,025,170. George Kranzlein and Martin Corell, Frankfort-am-Main, and Wilhelm Schaich, Bad Soden-am-Taunus, Germany, to General Aniline Works, Inc., N. Y. City.

Production alpha naphthol by sulfonating naphthalene. No. 2,025,197. William J. Cotton, Kenmore, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production amino-halogenanthraquinone sulfonic acids. No. 2,025,370. Fritz Baumann, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production arylides of 4-hydroxy-diphenyl-3-carboxylic acid. No. 2,025,-587. Oskar Haller, Offenbach-am-Main, and Heinrich Morschel, Cologne-Deutz, Germany, to General Aniline Works, Inc., N. Y. City.

Production aqueous solution of an alkoxyphenol and a water soluble 1-phenyl-2, 3-dimethyl-5-pyrazolone-4-amino-methane-sulfonate or -sulfinate. No. 2,025,869. Walter Kropp, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., Inc., N. Y. City.

Production anthrapyridone sulfonic acid. No. 2,025,921. Klaus Weinland, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production arylamino substituted 1, 4, 5, 8-naphthoylene-di-(arylimidazole) condensation products. No. 2,026,026. Wilhelm Eckert and Otto Braunsdorf, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production para diketocamphan carboxylic acid and hydroxy-oxo-camphan carboxylic acid. No. 2,026,289. Kenzo Tamura, Gyokujo Kihara, Yasuhiko Asahina, and Morizo Ishidate, Tokyo, Japan.

Production of halogenated indanthrenes. No. 2,026,647. James Ogilvie, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production solid mineral acid diazonium salts from halogen-4-amino-diphenylethers. No. 2,027,066. Karl Schnitzpahn, Offenbach-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production n-substituted aminophenols. No. 2,027,902. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production carbazole derivatives. No. 2,027,908. Hermann Hauser, Basel, and Max Bommer, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production carbazole derivatives. No. 2,027,909. Hermann Hauser, Basel, and Max Bommer, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production cumyl phenol. No. 2,028,043. Edgar C. Britton, Midland, Mich., and Lawrence F. Martin, New Orleans, La., to The Dow Chemical Co., Midland, Mich.

Production esters of sulfodicarboxylic acids. No. 2,028,091. Alphons O. Jaeger, Greentree, Pa., to American Cyanamid & Chemical Corp., N. Y. City.

Production benzanthrone thiazole. No. 2,028,114. Alexander J. Wuertz, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production benzanthrone selenazole. No. 2,028,116. Alexander J. Wuertz, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production thiazole compounds. No. 2,028,118. Earl E. Beard, South Milwaukee, and William L. Rintelman, Carrollville, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Coatings

Method of coating a non-metallic rigid article with chromium. No. 2,025,528. Ernst Paul Schreiber, Newark, N. J.

Production finely divided light colored metallic drier for use in paint or varnish. No. 2,025,870. Wilhelm Krumbhaar to Beck, Koller & Co., Inc., both of Detroit, Mich.

Production bronzing lacquer containing ester or salt of malic acid as gell preventative. No. 2,026,493. Denis J. Burke, London, England, to Commercial Solvents Corp., Terre Haute, Ind.

Manufacture of varnish bases. No. 2,027,338. Adolf Heck to Cook Paint & Varnish Co., both of Kansas City, Mo.

Production varnishes, varnish resins, and coating compositions. No. 2,027,339. Adolf Heck to Cook Paint & Varnish Co., both of Kansas City, Mo.

Production transparent films, foils, skins, etc., using an insoluble polysaccharide. No. 2,027,682. Friedrich Eichmann and Herbert Nerad, Arnau-am-Elbe, Czechoslovakia.

Production coating compositions. No. 2,027,686. Paul Friedrich, Cologne, Germany, to Trustkantoor Amstelland N. V., Amsterdam, Netherlands.

Dyes, Stains, etc.

Production water-insoluble azo dyes. No. 2,025,094. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production water-soluble diazoimino compounds. No. 2,025,095. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production azo dyes. No. 2,025,117. Herbert A. Lubs, Emmet F. Hitch, and Miles A. Dahlen to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production azo dyestuffs. No. 2,025,211. Arthur Howard Knight, Ashton-on-Mersey, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production vat dyestuffs of the anthraquinone series. No. 2,025,546. Paul Nawiasky, Ludwigshafen-am-Rhine, and Berthold Stein, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production water-insoluble azo dyestuffs. No. 2,025,582. Ernst Fischer, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Process for dyeing leather with an amino-azobenzene sulfonic acid dyestuff. No. 2,025,618. Emil Senn, Riehen, near Basel, Switzerland, to J. R. Geigy A. G., Basel, Switzerland.

Production azo dyestuffs. No. 2,025,991. Max Albert Kunz, Mannheim, Gerd Kochendoerfer, Ludwigshafen-am-Rhine, Kuno Maurach, Bad Durkheim, and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production dyestuffs of the oxazine series. No. 2,026,092. Georg Kranzlein and Heinrich Gruene, Frankfort-am-Main-Hochst, and Max Thiele, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production dyestuffs of the dioxazine series. No. 2,026,093. Georg Kranzlein, Heinrich Gruene, and Max Thiele, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Patents digested include issues of the "Patent Gazette," Dec. 24 through Jan. 11, inclusive.

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Production anthraquinone vat dyestuffs. No. 2,026,150. Max Utzinger and Max Bommer, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production dyestuff intermediate. No. 2,026,629. Norman Hulton Haddock, Blackley, Frank Lodge, Manchester, and Robert Robinson, Oxford, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production AR-N-(nitro-phenyl)—tetrahydronaphthylamines, for use as dyestuffs. No. 2,026,748. Henry Charles Olpin, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Process for making dye baths and printing colors for naphthol dyeing. No. 2,026,817. Heinrich Bertsch to H. Th. Bohme, Aktiengesellschaft, both of Chemnitz, Germany.

Production pyrazolone azo dyes. No. 2,026,861. Walther Benade, Dessau in Anhalt, Germany, to General Aniline Works, Inc., N. Y. City.

Production water insoluble azodyestuffs. No. 2,026,908. Friedrich Muth, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs. No. 2,026,920. Carl Taube, Leverkusen-I. G. Werk, and Josef Hilger, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., N. Y. City.

Formation of leuco compounds as vat dye bases. No. 2,027,144. Louis S. Bake, Penns Grove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production disazo dyestuffs. No. 2,027,178. Arthur Howard Knight, Ashton-on-Mersey, Sale, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production azo dyes. No. 2,027,206. Francis Hervey Smith, Woodstown, N. J., and Crayton Knox Black, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method of accelerated diazo printing. No 2,027,229. Walker M. Hinman to The Frederick Post Co., both of Chicago.

Production sulfur dyestuffs by treating aromatic compounds with agents yielding sulfur. No. 2,027,323. Paul Schetelig to "Society of Chemical Industry in Basle," both of Basel, Switzerland.

Production dyestuffs of the anthraquinone series. No. 2,027,658. Klaus Weinland and Ernst Kalckbrenner, Leverkusen I. G.-Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production blue azo dyestuff. No. 2,027,764. Gerald Bonhote to firm Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production mordant disazo dyestuffs. No. 2,027,777. Ernst Hug, Neu-Allschwil, near Basel, and Max Muller, Basel, Switzerland, to Durand & Huguenin S. A., Basel, Switzerland.

Production indigoid dyestuffs. No. 2,027,890. Ernst Stocklin, Binningen, near Basel, Switzerland, to "Society of Chemical Industry in Basle," Basel, Switzerland.

Production azo dyestuffs. No. 2,027,897. Gerald Bonhote to firm Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production bromination products of vat dyestuffs. No. 2,027,914. Karl Krauer to firm Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production dyestuff intermediates. No. 2,027,955. Ernest George Beckett, Grangemouth, Scotland, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production anthrimide carbazole vat dyestuffs. No. 2,028,103. Donald P. Graham, South Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production intermediates and dyestuffs of the anthraquinone series. No. 2,028,104. Donald P. Graham, South Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production dibenzanthrone-azole vat dyestuff. No. 2,028,115. Alexander J. Wuertz, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production dyestuffs and intermediates of the dibenzanthrone series. No. 2,028,117. Alexander J. Wuertz, Carrollville, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Explosives

Production propellant powder consisting of nitrocellulose, trinitrotoluene and triacetin. No. 2,026,531. George C. Hale and Donald R. Cameron, Dover, N. J.

Production smokeless powder by agitating smokeless powder base with solvent in a non-solvent vehicle. No. 2,027,114. Fredrich Olsen, Gordon C. Tibbitts, and Edward B. W. Kerone, Alton, Ill., to Western Cartridge Co., East Alton, Ill.

Production non-corrosive priming mixture comprising combustion initiating agent, nitrates and chromates as oxidizing agents, and zirconium as fuel. No. 2,027,825. George H. Jacobs, Kings Mills, Ohio, to The Peters Cartridge Co., a corp. of Del.

Fine Chemicals

Production arylamide containing at least one alkyl-mercapto group. No. 2,025,116. Herbert A. Lubs, Emmet F. Hitch, and Miles A. Dahlen to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production fatty acid ester of symmetrical di-alkyl ethylene glycols. No. 2,025,684. Virgil L. Hansley, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production of polyvalent metal derivatives of ortho cyano-aryl amide. No. 2,025,791. Jocelyn Field Thorpe and Reginald Patrick Linstead, South Kensington, London, England and John Thomas, Kingarth, Polmont, Scotland, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production oxidized product of water-insoluble hydroxylated fatty acids. No. 2,025,803. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo. to Tretolite Co., Webster Groves, Mo.

Production by alkaline hydrolysis of aryl-amines. No. 2,025,876. Herbert August Lubs and John Elton Cole to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production non-resinous, hydrophilic ester of an aliphatic lipophile carboxylic acid. No. 2,025,984. Benjamin R. Harris, Chicago.

Production light-sensitive organic chromic salt colloid layer. No. 2,025,996. Gaston Maillet, Saint Ouen, France.

Production esters of N-P-aminoaryl-carbamic acids. No. 2,026,618. Robert E. Etzelmiller to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production N-P-amino-aryl-carbamic acids. No. 2,026,619. Robert Eugene Etzelmiller to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production hydroaromatic alcohol by heating a tertiary alkyl-phenol with finely divided nickel in presence of hydrogen. No. 2,026,668. Hermann Alexander Bruson and Lloyd W. Covert to Rohm & Haas Co., all of Philadelphia.

Production mercaptobenzothiazyl-aryldisulfides. No. 2,026,863. Max Bogemann, Cologne-Mulheim, Germany, to I. G., Frankfort-am-Main, Germany.

Production aliphatic acid anhydrides by reacting aliphatic acid and acetic anhydride vapor in contact with magnesium perchlorate. No. 2,026,985. Carl J. Malm and Webster E. Fisher to Eastman Kodak Co., all of Rochester, N. Y.

Production thiazoline compound. No. 2,027,030. Max Engelmann to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production oxazoline compound. No. 2,027,031. Max Engelmann to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production salt formed by reaction of procaine base and high carbon fatty acid for use as anaesthetic. No. 2,027,126. Oscar H. Stover and Edmund H. Brigham to The Oleothesin Co., Inc., all of Buffalo, N. Y.

Production protocatechuic aldehyde. No. 2,027,148. Marion Scott Carpenter, Nutley, and Eric C. Kunz, Montclair, N. J., to Givaudan-Delawanna, Inc., N. Y. City.

Production oily reaction product of polycarboxylic acid and hydrogenated castor oil. No. 2,027,467. Merlin Martin Brubaker to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production 2-chlorobutadiene-1, 3 by reacting vinyl acetylene with hydrogen chloride in presence cuprous chloride. No. 2,027,550. Granville A. Perkins, South Charleston, W. Va., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Production therapeutic agent comprising mixture of codeine salt with salt of papaverine. No. 2,027,722. Harold Sheely Diehl to Board of Regents of Univ. of Minnesota, both of Minneapolis, Minn.

Production substituted aldols. No. 2,027,856. Kurt Billig, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Production etherified glycollic acid esters. No. 2,027,991. Wolfgang Lubbert and Ernst Ludwig Muller to Henkel & Cie. G. m. b. H., all of Dusseldorf, Germany.

Production ethylene diamine by reacting vaporized liquid ammonia with ethylene dichloride. No. 2,028,041. Frederick C. Bersworth, Hopkinton, Mass., to Frank Kottek, (F. C. Bersworth Labs.), Ashland, Mass.

Production glycollic acid by treating aqueous alkali metal glycollate and alkali metal chloride with a water soluble calcium salt. No. 2,028,064. Ernest F. Grether and Russell B. Du Vall to The Dow Chemical Co., all of Midland, Mich.

Production thiazyl monosulfides. No. 2,028,082. Jan Teppema, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Glass and Ceramics

Production X-ray absorption glass containing lead and barium oxides but substantially free from alkali. No. 2,025,099. Frederick Gelstharp, Tarentum, Pa., to Pittsburgh Plate Glass Co., a corp. of Pa.

Production ceramic products containing silica and magnesia with alumina. No. 2,025,762. Andrew Malinovsky, South Gate, Cal., to Malinite Corp., Los Angeles, Cal.

Production high silica cement. No. 2,026,064. Edward W. Rice, Santa Cruz, Cal., to Santa Cruz Portland Cement Co., San Francisco.

Production blue coated ceramic article. No. 2,026,086. Frederick James Farncomb to Corning Glass Works, both of Corning, N. Y.

Production magnesia refractories. No. 2,026,088. Frederic A. Harvey and Raymond E. Birch to Harbison-Walker Refractories Co., all of Pittsburgh, Pa.

Production light weight porous concrete. No. 2,026,207. Erik B. Bjorkman, Montreal, Quebec, Canada.

Production laminated glass using laminating sheet treated with mixture of phthalic acid esters. No. 2,026,717. George B. Watkins to Libbey-Owens-Ford Glass Co., both of Toledo, Ohio.

Laminated glass made with thermoplastic cellulose derivative binding sheets, sheets bonded with film containing a mixed carbohydrate organic ester. No. 2,026,987. James G. McNally and Sterling S. Sweet to Eastman Kodak Co., all of Rochester, N. Y.

Production burned chromite refractory material comprising undecomposed chromite spinel and magnesium silicate. No. 2,028,018. Gilbert E. Seil, Conshohocken, Pa., to E. J. Lavino & Co., Philadelphia.

Industrial Chemicals

Method purifying chlorinated hydrocarbons. No. 2,025,024. Edgar Britton, Gerald H. Coleman, John W. Zemba, and Edward C. Zuckermandel to The Dow Chemical Co., all of Midland, Mich.

Dehalogenation of organic halides by process of hydrogenation. No. 2,025,032. Herrick R. Arnold, Elmhurst, and Wilbur A. Lazier, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method treating sulfide ores by roasting to either sulfate or oxide. No. 2,025,068. Thomas A. Mitchell to Hughes-Mitchell Processes, Inc., both of Denver, Colo.

Productive activated carbon comprising carbonization of crude material and bringing of carbonized material into sprayed zinc chloride solution. No. 2,025,367. Victor Weerts, Brussels, Belgium.

Method converting a mixture of nitrosyl chloride and hydrogen into nitrogen monoxide and hydrogen chloride. No. 2,025,391. Oskar Kaselitz, Berlin, Germany.

Production ammonium sulfate and denaturant from petroleum treatment acid sludges. No. 2,025,401. John T. Rutherford, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco.

Production thiotetraphosphates by reacting an alkali metal metaphosphate with an alkali metal sulfide. No. 2,025,503. Augustus H. Fiske, Warren, and Charles S. Bryan, Providence, R. I., to Rumford Chemical Works, Rumford, R. I.

Production oxygenated aliphatic organic compounds. No. 2,025,676. John C. Woodhouse to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production organic acids from steam, carbon monoxide, and an olefinic hydrocarbon. No. 2,025,677. John C. Woodhouse to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production acetylene by treating methane-containing gas in absence of air. No. 19,794—reissue. Martin Banck, Bucharest, Rumania, to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany.

Production light colored liquid chlorinated naphthalene. No. 2,025,742. Ernest R. Hanson, Bloomfield, and Sandford Brown, Montclair, N. J., to Halowax Corp., N. Y. City.

Continuous production of sodium sulfate by reacting calcium sulfate with solution of sodium carbonate in presence of sodium sulfate. No. 2,025,756. Markus Larsson, Berlin, Germany.

Production oxidation products of castor oil. No. 2,025,806. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Method of oxidizing castor oil. No. 2,025,807. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Method oxidizing castor oil using alpha pinene as an auto-oxidizer-catalyst. No. 2,025,808. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Production oxidation products of castor oil using dipentene as an auto-oxidizer-catalyst. No. 2,025,809. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Method of coal distillation. No. 2,025,882. Georges Francis Michot-Dupont, Vincennes, France, to "Physical Chemistry Research Cy," Wilmington, Del.

Production reaction product of an abietic acid ester and maleic anhydride. No. 2,025,947. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Production denaturant for fats and fatty oils comprising a benzyl derivative of a saccharide. No. 2,025,954. John E. Muth, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco.

Production basic lead sulfate. No. 2,026,033. Fred E. Gregory, Ruby, Ariz., John I. McClaren, Galena, Kans, and Paul R. Hamilton, Joplin, Mo., to The Eagle-Picher Lead Co., Cincinnati, Ohio.

Production methyl chloride by reacting hydrogen chloride and methanol in presence aqueous zinc chloride solution. No. 2,026,131. Hans Klein, Mannheim, and Conrad Pfaundler, Oppau, Germany, to I. G., Frankfort-am-Main, Germany.

Method preparing yeast fermentable mash from hydrol. No. 2,026,237. David A. Legg to Commercial Solvents Corp., both of Terre Haute, Ind.

Production ammonium sulfate by neutralization of acid sludge with ammonia. No. 2,026,250. Frederic M. Pyzel, Piedmont, and Jan D. Ruys, Pittsburgh, Cal., to Shell Development Co., San Francisco.

Production abrasive material comprising heat treated and cooled chrome ore material with accompanying gangue. No. 2,026,255. Gilbert E. Seil, Cynwyd, Pa., to E. J. Lavino & Co., Philadelphia.

Production activated carbon. No. 2,026,355. Frank Henry Cone, Southgate, London, and Clive Beckingham Houlder, Herts, England, to Activities, Ltd., Nottinghamshire, England.

Method increasing vitamin content of vitamin bearing oils. No. 2,026,395. Horatio Porter Loomis to Silmo Chemical Co., Inc., both of Vineland, N. J.

Production soluble, pourable, and stable alkali silicate compounds. No. 2,026,451. Franz Albertshauser, Dusseldorf, Germany, to Philadelphia Quartz Co., Philadelphia, Pa.

Recovery of sulfuric acid and resins from acid tar. No. 2,026,456. George William James Bradley, Parkgate, near Rotherham, England.

Process treatment of soy beans. No. 2,026,676. Lowell O. Gill to A. E. Staley Mfg. Co., both of Decatur, Ill.

Process treating ferriferous raw materials. No. 2,026,683. Friedrich Johannsen, Magdeburg, Germany, to Fried. Krupp Grusonwerk Aktiengesellschaft, Magdeburg-Buckau, Germany.

Process sulfating the non-ferrous metals contained in ferruginous sulfide ores or roasts. No. 2,026,775. Carl Paul Debuch, Frankfort-am-Main, Germany, to American Lurgi Corp., N. Y. City.

Production phosphoric acid esters of fatty acid monoglycerides. No. 2,026,785. Benjamin R. Harris, Chicago.

Production catalyst for sulfur dioxide reduction. No. 2,026,819. Maitland C. Boswell, Toronto, Ontario, Canada.

Production carbon bisulfide by heating, in absence of oxygen, a mixture of carbon, finely divided sulfur, and liquid carbon bisulfide. No. 2,026,840. Michael J. Leahy, Fort Worth, Tex.

Manufacture of carbureted water gas with heavy oil. No. 2,026,877. Owen B. Evans to The United Gas Improvement Co., both of Philadelphia.

Production acrylic acid by heating ethylene cyanohydrin with sulfuric and water. No. 2,026,894. Rowland Hill, Blackley, Manchester, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Process reacting alkali metals with aromatic hydrocarbons. No. 2,027,000. Norman D. Scott, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production deodorized calcium chloride. No. 2,027,093. Charles R. Downs, Old Greenwich, Conn., to Weiss & Downs, Inc., N. Y. City.

Use of calcium chloride solution in dehumidifying air. No. 2,027,094. Charles R. Downs, Old Greenwich, Conn., to Weiss & Downs, Inc., N. Y. City.

Production of urea derivatives. No. 2,027,150. Samuel Coffey and John Edgar Schofield, Huddersfield, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Hydrogenation of aliphatic alcohols and esters. No. 2,027,182. Wilbur A. Lazier, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production acid calcium citrate. No. 2,027,264. Alexander Hutcheon Bennett, London, England.

Vanadium contact mass for catalytic oxidation comprising a vanadium compound and hydrous silica. No. 2,027,316. Edward S. Johnson, New Rochelle, N. Y., to The Calco Chemical Co., Inc., Boundbrook, N. J.

Flotation agent for minerals comprising a diaryl disulfide and a thiophenol. No. 2,027,357. Frederick G. Moses, N. Y. City, Raymond W. Hess, Buffalo, and Robert L. Perkins, East Aurora, N. Y., to The Barrett Co., N. Y. City.

Production crystalline mercurous sulfate catalyst by contacting sulfuric acid-sodium nitrate solution with mercury. No. 2,027,364. Ronald J. Baird, Milwaukee, Wis.

Method converting aldehydes to acids by reacting aldehyde and water in vapor phase in presence of catalytic mass. No. 2,027,377. William J. Hale, Midland, Mich.

Method converting alcohols into acids by contacting alcohol and water in vapor phase in presence dehydrogenative catalyst. No. 2,027,378. William J. Hale, Midland, Mich.

Process removing water from vaporous mixtures containing aliphatic anhydrides. No. 2,027,420. Henry Dreyfus, London, England.

Production alkali dichromate by reacting alkali monochromate with carbonic acid under pressure. No. 2,027,477. Ernst Hackhofer and Annemarie Beuther, Krefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Production aqueous dispersion containing bitumen, soluble soap, and a mineral powder colloid. No. 2,027,582. Jacob Mitchell Fain, Brooklyn, N. Y., to The Patent & Licensing Corp., N. Y. City.

Production aqueous dispersions. No. 2,027,584. Leonard G. Gabriel, John F. T. Blott, William L. Peard, and Lawrence W. G. Firmin, London, England, Louis Meunier, Lyon, France, and Johan L. van der Minne, Amsterdam, Netherlands, to The Flintkote Co., N. Y. City.

Production of activated absorbent and decolorizing carbon. No. 2,027,695. Andrew McCulloch, Stalybridge, and Robert Edwin Hargraves, deceased, Davyhulme, England; Winifred Elizabeth Hargraves, administratrix for deceased; to Carbo-Norit-Union Verwaltungs G. m. b. H., Frankfort-am-Main, Germany.

Production basic magnesium carbonate. No. 2,027,714. Samuel A. Abrahams, Redwood City, Cal., to Plant Rubber & Asbestos Works, San Francisco, Cal.

Electrode for use in carbon black production where raw material used is an organic liquid. No. 2,027,732. John J. Jakosky, Los Angeles, Cal., to Electroblacks, Inc., Culver City, Cal.

Production shaped articles of boron carbide. No. 2,027,786. Raymond R. Ridgway and Bruce L. Bailey, Niagara Falls, N. Y., to Norton Co., Worcester, Mass.

Production basic titanic oxalate. No. 2,027,812. Sydney Francis William Crundall to Peter Spence & Sons, Ltd., both of Manchester, England.

Process stabilizing hydrogen peroxide solutions with pyrophosphoric acid. No. 2,027,838. Joseph S. Reichert, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Purification of hydrogen peroxide solutions by precipitating stannous hydroxide in the solution. No. 2,027,839. Joseph S. Reichert, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Regeneration of spent tungsten oxide catalysts using a strong base to form a soluble tungstate and acidifying to produce tungsten oxide. No. 2,027,855. Ralph Lyman Brown, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Process of polymerizing mono-saccharides by melting with small amounts strong mineral acids. No. 2,027,904. Eduard Farber, Heidelberg, Germany, to N. V. Internationale Suiker en Alcohol Compagnie International Sugar and Alcohol Co. "Isaco", The Hague, Netherlands.

Production silica capable of adhering to a material. No. 2,027,931. Arthur B. Ray, Bayside, N. Y., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Production active silica adsorbent. No. 2,027,948. Herbert J. Wollner, Brooklyn, and John V. Shinn, Flushing, N. Y., to General Chemical Co., N. Y. City.

Process removing catalysis inhibitors from aqueous solution. No. 2,027,982. Henry F. Johnstone to Board of Trustees of the Univ. of Illinois, both of Urbana, Ill.

Production unsaturated acid esters. No. 2,028,012. Ebenezer Emmet Reid, Baltimore, Md., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production recrystallized chromite having gangue disseminated over crystal surfaces. No. 2,028,017. Gilbert E. Seil, Conshohocken, Pa., to E. J. Lavino & Co., Philadelphia.

Simultaneous hydrolysis and alcoholysis of aryl halides. No. 2,028,065. William J. Hale to The Dow Chemical Co., both of Midland, Mich.

Production secondary aromatic amines. No. 2,028,074. Werner M. Lauter, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Production halogenated phenyl-diphenyl oxide by reacting a phenyl-diphenyl oxide with chlorine or bromine. No. 2,028,081. Wesley C. Stoesser to The Dow Chemical Co., both of Midland, Mich.

Production hydrogen halides by reacting halogen and hydrogen sulfide in presence of a liquid phase sulfur halide. No. 2,028,087. Albert M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Method extracting iodine from natural iodiferous brines. No. 2,028,099. Leonard C. Chamberlain and George W. Hooker to The Dow Chemical Co., all of Midland, Mich.

Method obtaining hydrogen sulfide. No. 2,028,125. Joseph A. Shaw, Pittsburgh, Pa., to The Koppers Co. of Del., a corp. of Del.

Metals, Alloys, Ores

Cementing agent for iron and steel. No. 2,025,050. Hugo Hanusch, Berlin, Germany, to E. F. Houghton & Co., Philadelphia.

Production hard metal for lining comprising cast iron, borax, silicon, all melted with some excess of carbon. No. 2,025,060. Frederick A. Kormann, Glendale, and Walter F. Hirsch, Huntington Park, Cal., to Industrial Research Laboratories, Ltd., San Francisco.

Production water-soluble colloidal molybdenum. No. 2,025,405. Percy Vessie, Ossining, N. Y.

Production steel containing small amount manganese. No. 2,025,425. Earl C. Smith, Canton, Ohio, to Republic Steel Corp., Youngstown, Ohio.

Production beryllium alloys by reacting carbon and beryllium oxide. No. 2,025,614. Wilhelm Rohn, Hanau, Germany, to Heraeus-Vacuumschmelze, A. G., Hanau-am-Main, Germany.

Production beryllium alloys by reacting beryllium oxide, carbon, and at least one additional alloying ingredient. No. 2,025,615. Wilhelm Rohn to Heraeus-Vacuumschmelze, A. G., both of Hanau-am-Main, Germany.

Production beryllium alloys by dissolving beryllium carbide in a bath of molten alloying metal. No. 2,025,616. Wilhelm Rohn, Hanau, Germany, to Heraeus-Vacuumschmelze, A. G., Hanau-am-Main, Germany.

Production copper alloys containing chromium and zirconium. No. 2,025,662. Franz R. Henzel, Indianapolis, Ind., and Earl I. Larsen, Newark, N. J., to Westinghouse Electric & Mfg. Co, East Pittsburgh, Pa.

Production metallic magnesium from its compounds in the form of vapor. No. 2,025,740. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Production high chrome steel from chrome-iron using a basic converter. No. 2,026,183. Lewis B. Lindemuth to Moa Bay Co., both of N. Y. City.

Production copper alloy containing zirconium and silver. No. 2,026,209. Porter H. Brace, Forest Hills, Pa., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Production alloy containing nickel, chromium, and metallic calcium. No 2,026,243. David Pelton Moore, N. Y. City.

Production magnetic iron and steel by mixing carbonless reduced iron and high phosphorus reduced iron. No. 2,026,390. Heihachi Kamura, Tobata-Shi, Japan.

Welding rod iron alloy containing carbon, nickel, vanadium, manganese, and silicon. No. 2,026,418. John J. Crowe, Westfield, N. J., to Air Reduction Co., Inc., N. Y. City.

Production solid welds on iron and steel alloy articles containing manganese. No. 2,026,467. John Howe Hall, to Taylor-Wharton Iron & Steel Co., both of High Bridge, N. J.

Production of a series of free cutting aluminum base alloys containing varying amounts of alloying metals. Nos. 2,026,540 to 2,026,579 inclusive. Louis W. Kempf, Walter A. Dean, Charles G. Jancura, and Howard L. Hopkins, Cleveland, Ohio, and William L. Fink, Oakmont, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Production magnesium base alloy containing lead and cadmium. No. 2,026,589. Roy E. Paine, Cleveland, Ohio, to Magnesium Development Corp., a corp. of Del.

Production magnesium base alloy containing lead and aluminum. No. 2,026,590. Roy E. Paine, Cleveland, Ohio, to Magnesium Development Corp., a corp. of Del.

Production magnesium base alloy containing lead, aluminum and tin. No. 2,026,591. Roy E. Paine, Cleveland, Ohio, to Magnesium Development Corp., a corp. of Del.
Production magnesium base alloy containing lead, aluminum, manganese, and calcium. No. 2,026,592. Roy E. Paine, Cleveland, Ohio, to Magnesium Development Corp., a corp. of Del.
Method of electrodepositing metals. No. 2,026,718. Louis Weisberg and William B. Stoddard, Jr., to Weisberg & Greenwald, Inc., all of N. Y. City.
Sintered hard metallic alloy containing tungsten carbide, carbon, vanadium carbide, and either iron, cobalt or nickel. No. 2,026,958. Karl Becker, Berlin-Steglitz, Karl Schroter, Berlin-Lichtenberg, and Hans Wolff, Berlin, Germany, to General Electric Co., Schenectady, N. Y.
Production hot and cold workable welding rod alloys. No. 2,027,330. Richard A. Wilkins to Revere Copper & Brass Inc., both of Rome, N. Y.
Electrodeposition of metals of the platinum group. No. 2,027,358. Alan Richard Powell and Emyr Conwy Davies to Johnson Matthey & Co. Ltd., all of London, England.
Method of powder metallurgy. No. 2,027,532. Charles Hardy, Pelham, N. Y., to Hardy Metallurgical Co., N. Y. City.
Production chrome nickel steel alloy. No. 2,027,554. Paul Schafmeister and Erwin Alfred Spenle to Fried. Krupp A. G., all of Essen, Germany.
Production copper base alloy comprising copper, nickel, aluminum and beryllium. No. 2,027,750. Elmer L. Munson, Naugatuck, Conn., to The American Brass Co., Waterbury, Conn.
Production treating cobalt-tungsten-chromium alloys. No. 2,027,780. Werner Koster, Krefeld, Germany, to Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.
Production ductile copper base alloy comprising copper and tellurium. No. 2,027,807. Henry L. Burghoff, Yalesville, and David E. Lawson, Waterbury, Conn., to The Chase Companies, Inc., Waterbury, Conn.
Production metals and metallic alloys containing rather large amounts of nitrogen. No. 2,027,837. William C. Read, New Rochelle, N. Y., to Electro Metallurgical Co., a corp. of W. Va.
Method treating steel-making slags by addition of zirconium oxide. No. 2,027,868. Augustus B. Kinzel, Douglaston, N. Y., to Electro Metallurgical Co., a corp. of W. Va.
Production of a series of alloys for use as permanent magnets comprising varying proportions of more or less common metals. Nos. 2,027,994 to 2,028,000 inclusive. Tokushishi Mishima, Ochiaimachi, Toyotamagori, Tokyo, Japan.
Welded metal pipe containing iron, carbon, manganese, phosphorus, copper, and practically no silicon. No. 2,028,096. George G. Walker, Poland, Ohio, to Republic Steel Corp., Youngstown, Ohio.
Production sponge iron. No. 2,028,105. Casimir J. Head, Montreal, Quebec, Canada.

Paper and Pulp

Method liberating plant fiber from connective tissue using water containing an emulsifying agent. No. 2,026,584. Joseph A. Manahan, Boston, Mass.
Method softening bleached and dyed ruscus. No. 2,026,873. John M. Dux, Jacksonville, Fla.
Production refined pulp from straw of graminaceous plants. No. 2,026,900. Kenta Kodama, Fukui, Japan.
Production wood pulp for chemical use. No. 2,028,080. Raphael L. Stern, New Brunswick, N. J., to Hercules Powder Co., Wilmington, Del.

Petroleum Chemicals*

Method treating hydrocarbon oils in vapor phase with solution containing free hypochlorous acid and a zinc halide. No. 2,021,739. Jacque C. Morrell and Gustave Egloff to Universal Oil Products Co., all of Chicago.
Vapor phase refining of hydrocarbon distillates by contacting with aqueous free halogenated acid. No. 2,021,740. Gustav Egloff and Jacque C. Morrell to Universal Oil Products Co., all of Chicago.
Process for separation of paraffinic and naphthenic constituents of mineral oil. No. 19,763—reissue. Malcolm H. Tuttle, New Rochelle, N. Y., to Max B. Miller & Co., Inc., N. Y. City.
Process obtaining colloidal dispersions of metals in oils. No. 2,021,885. John C. Bird, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.
Solvent extraction of petroleum distillates. No. 2,022,259. John V. Starr, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.
Method purifying acid-treated light hydrocarbon oil. No. 2,022,268. Francis M. Archibald, Roselle, and Philip Janssen, Elizabeth, N. J., to The Standard Oil Development Co., a corp. of Del.
Process refining mineral oil by distributing metal hydrate to acid-treated oil. No. 2,022,358. Clarence R. McKay and John H. Smith, Sand Springs, Okla., to Sinclair Refining Co., N. Y. City.
Method regenerating sodium plumbite solution by heat and agitation to break up emulsion. No. 2,022,550. Frederick W. Stone and James N. Garrison, Cleveland, Ohio.
Production doctor solutions for sweetening sour oils from impure lead sludge by extraction with organic solvent. No. 2,022,558. Byron F. Dooley, Jr., Port Arthur, Tex., to The Texas Co., N. Y. City.
Chlorination of hydrocarbons by agitating petroleums with aqueous hydrochloric and hypochlorous acids. No. 2,022,619. Benjamin Gallsworthy, Glenham, N. Y., to The Texas Co., N. Y. City.
Process reducing carbon content of acid sludge. No. 2,022,800. Arthur B. Brown and David W. Bransky, Hammond, Ind., to Standard Oil Co., Chicago.
Oxidation of hydrocarbons by reacting in vapor phase with an oxygen-containing gas in presence nitrogen oxides as catalysts. No. 2,022,845. Frank J. De Rewal, Camillus, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.
Process sweetening light naphthas from crude using alkaline solution of sodium plumbite. No. 2,022,847. Arthur F. Endres, Hammond, Ind., to Standard Oil Co., Chicago.
Process sweetening hydrocarbon oils by addition of mercaptan. No. 2,022,942. Walter A. Schulze and Lovell V. Chaney to Philips Petroleum Co., all of Bartlesville, Okla.

* *Includes patents from "Patent Gazette," Nov. 19 through Jan. 11, inclusive.*

Production low pour point mineral oil composition. No. 2,022,990. Adrianus Johannes van Peski, Bussum, Netherlands, to Shell Development Co., San Francisco, Cal.
Solvents extraction process for petroleum compounds. No. 2,023,109. Willem Johannes Dominicus Van Dijck, The Hague, Netherlands, to Shell Development Co., San Francisco, Cal.
Production motor fuel distillate. No. 2,023,110. Robert E. Wilson, Chicago, Ill., to Gasoline Antioxidant Co., Wilmington, Del.
Production motor fuel of high antiknock value. No. 2,023,142. Nicolaas Max, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.
Process dewaxing hydrocarbon oils by chilling with a dilutent. No. 2,023,181. Earl Petty, Hempstead, N. Y., to Alco Products Inc., N. Y. City.
Production mineral oil. No. 2,023,369. Hijam Limburg, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.
Production gasoline type motor fuel containing an organic anti-knocking agent. No. 2,023,372. Nicolaas Max, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.
Production refined products from mineral oils. No. 2,023,375. Willem J. D. van Dijck, The Hague, Netherlands, to Shell Development Co., San Francisco, Cal.
Stabilizing cracked petroleum distillates by use of diaminophenol. No. 2,023,385. Le Roy G. Story, Glenham, N. Y., to The Texas Co., N. Y. City.
Process producing hydrocarbons from heavy oils by passing oil or vapor over coke within a high frequency field. No. 2,023,754 Fritz Uhlmann, Berlin, Germany, to Aktis Akteingesellschaft, Schaffhausen, Switzerland.
Method inhibiting gum formation in cracked hydrocarbon distillates using monochlorhydroquinone. No. 2,023,871. Louis A. Clarke, Fishkill, and Charles C. Towne, Poughkeepsie, N. Y., to The Texas Co., N. Y. City.
Process breaking petroleum emulsions of water-in-oil type using neutral phthalyl mono-olein. No. 2,023,976. Claudius H. M. Roberts, San Marino, Cal., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions of water-in-oil type using super-oxidized castor oil body. No. 2,023,979. Charles N. Stehr, Alhambra, Cal., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions of water-in-oil type using oxidation product of mixture of castor oil with one or more semi-drying oils. No. 2,023,980. Charles N. Stehr, Alhambra, Cal., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions of water-in-oil type using oxidation product of a mixture of castor oil and sardine oil. No. 2,023,981. Charles N. Stehr, Alhambra, Cal., to Tretolite Co., Webster Groves, Mo.
Process for breaking petroleum emulsions of water-in-oil type. No. 2,023,982. Charles N. Stehr, Alhambra, Cal., to Tretolite Co., Webster Groves, Mo.
Removing finely divided suspended waste matter from used journal box waste oil using sodium silicate and sodium aluminate. No. 2,023,988. William T. Bissell and Thomas W. Potter to Journal Box Servicing Corp., all of Indianapolis, Ind.
Process breaking petroleum emulsions of water-in-oil type using certain dehydration products of ricinoleic acid. No. 2,023,993. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.
Process for breaking petroleum emulsions of water-in-oil type. No. 2,023,994. Melvin De Groote, St. Louis, and Arthur F. Wirtel, Richmond Heights, Mo., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions of water-in-oil type using a certain organic ester. No. 2,023,995. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions of water-in-oil type using an oxyhendecenoic acid material. No. 2,023,996. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.
Process breaking petroleum emulsions. No. 2,023,997. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.
Production of stable homogeneous asphalt base. No. 2,024,096. Felton S. Dengler, Earl W. Gardner, and Dudley H. Felder, Post Neches, Tex., to The Texas Co., N. Y. City.
Preparation fluorescent bodies and pour point reducing bodies from petroleum residue. No. 2,024,106. Harry Levin, Beacon, N. Y., to The Texas Co., N. Y. City.
Process de-waxing hydrocarbon oils by mixing with ortho-dichlorobenzene and an aliphatic ketone having wax anti-solvent properties. No. 2,024,107. Bernard Y. McCarty, Beacon, N. Y., and William E. Skelton, Fort Worth, Tex., to The Texas Co., N. Y. City.
Method treating and purifying motor fuels. No. 2,024,117. William M. Stratford to The Texas Co., both of N. Y. City.
Method of oil well treatment. No. 2,024,119. William V. Vietti and Allen D. Garrison, Houston, Tex., to The Texas Co., N. Y. City.
Method refining mineral oils using a mixed aliphatic-aromatic amine. No. 2,024,221. Lawrence M. Henderson, Narberth, Pa., to The Atlantic Refining Co., Philadelphia.
Method treating hydrocarbon oils which involves treating distillate with sulfur dioxide in presence of aluminum chloride. No. 2,024,681. Richard F. Davis to Universal Oil Products Co., both of Chicago.
Method separating oxidation products of hydrocarbons. No. 2,024,954. Orland R. Sweeney, Frank C. Vilbrandt, Henry H. Beeson, and Howard A. Montgomery, Ames, Iowa, to Hanlon-Buchanan, Inc., Tulsa, Okla.
Method removing sulfur from low gravity petroleum oils. No. 2,024,968. John D. Fields, Los Angeles, Cal.
Production lubricant comprising neat's foot oil grease, caustic soap and mineral oil. No. 2,024,990. Gus Kaufman, Beacon, N. Y., to The Texas Co., N. Y. City.
Deodorizing exhaust gases of Diesel motors by contacting hot gases with copper manganite catalyst. No. 2,025,140. Wilhelm Wenzel, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.
Stabilization of cracked hydrocarbon motor fuels by adding a dihydroxy naphthalene as gum inhibitor. No. 2,025,192. Frederick Baxter Downing, Carneys Point, N. J., and Herbert Warren Walker, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Production penetrating lubricant composition comprising pine fatty acids, deflocculated graphite and a non-viscuous petroleum distillate. No. 2,025,517. Roy D. King, Jackson Heights, N. Y., to Socony-Vacuum Oil Co., Inc., N. Y. City.
Production rapid setting liquid asphalt from cracked petroleum oil. No. 2,025,709. Charles M. Baskin, Montreal, Quebec, Canada, to Standard Oil Development Co., a corp. of Del.
Distillation of acid treated oils. No. 2,025,766. Brian Mead, Houston, Tex., to Standard Oil Development Co., a corp. of Del.

Process breaking petroleum emulsions of the water-in-oil type using poly keto fatty acid body. No. 2,025,804. Melvin De Groote, St. Louis, Bernhard Keiser, Webster Groves, and Arthur F. Wirtel, Richmond Heights, Mo., to Tretolite Co., Webster Groves, Mo.

Process breaking petroleum emulsions of the water-in-oil type using a keto fatty acid body. No. 2,025,805. Melvin De Groote, St. Louis, Bernhard Keiser, Webster Groves, and Arthur F. Wirtel, Richmond Heights, Mo., to Tretolite Co., Webster Groves, Mo.

Production paving mixture of granular bituminous material. No. 2,025,945. Charles N. Forrest, Cranford, N. J., to The Barber Asphalt Co., Philadelphia.

Method separating hydrocarbon oils into naphthenic and paraffinic parts by extraction with phenol. No. 2,025,965. James M. Whiteley, Roselle, N. J., to Standard Oil Development Co., a corp. of Del.

Method prolonging adhesive life of asphalt by treating to remove unsaturated compounds. No. 2,026,039. George R. Hoover to The American Rolling Mill Co., both of Middletown, Ohio.

Method treating mineral oils containing naphthenic soaps to produce asphalt. No. 2,026,073. Herman Theodoor Swerissen, Monheim, Germany, to Shell Development Co., San Francisco, Cal.

Process treating mineral oils by using first acid, then neutralizing with alkali, then contacting with an alkaline earth of alkali chloride aqueous solution. No. 2,026,213. Bernard Richard Carney, East Chicago, and Ralph Hoagland Crosby, Hammond, Ind., to Shell Development Co., San Francisco, Cal.

Process breaking petroleum emulsions of water-in-oil type using hydroxylated, non-sulfo fatty acid body. No. 2,026,217. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo. to Tretolite Co., Webster Groves, Mo.

Process breaking petroleum emulsions of water-in-oil type using a sulfo body. No. 2,026,218. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Process breaking petroleum emulsions of water-in-oil type using a sulfite addition product. No. 2,026,219. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Process recovering olefine hydrocarbons from gases. No. 2,026,265. Harry T. Bennett to Mid-Continent Petroleum Corp., both of Tulsa, Okla.

Method treating petrolatum by adding uranium nitrate and anhydrous aluminum chloride. No. 2,026,492. Harry T. Bennett, Harris H. Hopkins, and Jerry R. Marshall to Mid-Continent Petroleum Corp., all of Tulsa, Okla.

Production unsaturated hydrocarbons from paraffins by heating in presence of finely divided carbon. No. 2,026,731. Henry Dreyfus, London, England.

Separating paraffinic and naphthenic hydrocarbon fractions in mineral oils using acetophenone. No. 2,026,812. Edwin R. Birkhimer to The Atlantic Refining Co., both of Philadelphia.

Process for dewaxing lubricating oils. No. 2,027,346. Bernard Y. McCarty, Beacon, N. Y., and William E. Skelton, Cambridge, Mass., to The Texas Co., N. Y. City.

Method refining hydrocarbon oils using nitro-alcohols. No. 2,027,354. Louis A. Clarke, Fishkill, N. Y., to The Texas Co., N. Y. City.

Method treating motor fuel using reaction product of a wood tar inhibitor and an alkyl amine. No. 19,804—reissue. Wayne L. Benedict to Universal Oil Products Co., both of Chicago.

Method treating cracked hydrocarbon motor fuel by stabilizing against gum formation with a benzene nitrogen compound. No. 2,027,394. Edward W. McMullan, Philadelphia, Pa., to Gasoline Antioxidant Co., Wilmington, Del.

Production bituminous emulsion using heat-treated rosin soap as emulsifying agent. No. 2,027,404. James B. Small, East Cleveland, Ohio, to The Glidden Co., Cleveland.

Stabilizing cracked gasoline using crude condensation product of di-alpha naphthylamine and cresol. No. 2,027,462. Eugene Ayres, Swarthmore, and Mark L. Hill, Yeadon, Pa., to Gulf Refining Co., Pittsburgh.

Recovery of by-product in the cracking of tar and bituminous schist oils. No. 2,027,464. Louis Boulanger, Brussels, and Ferdinand Emsens, Lommel, Belgium.

Use of nitric, acetic and sulfuric acids in the chemical refining of petroleum oil. No. 2,027,648. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Process treating lubricating oil stock by thinning and mixing with alkali metal solid salt. No. 2,027,770. John D. Fields, Los Angeles, Cal.

Method treating methane to produce hydrocarbon fuels. No. 2,028,014. Henry Reinecke, Toronto, Ontario, Canada.

Pigments*

Manufacture zinc oxide by introducing blast of air into stream of zinc vapor and gaseous combustion products. No. 2,021,284. Earl H. Bunce, Clarence J. Lentz and George T. Mahler, Palmerton, Pa., to The N. J. Zinc Co., N. Y. City.

Process differentially leaching ores to separate lead and other metals from zinc sulfide. No. 2,021,896. Maxwell George Platten, Los Angeles, Cal.

Process of treating zinc sulfide or zinc oxide pigment. No. 2,021,990. Harlan A. Depew, Columbus, Ohio, to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Apparatus for treatment of pigments. No. 2,021,991. Harlan A. Depew, Columbus, Ohio, to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Improvement in drying of a wet pigment mass. No. 2,024,611. George F. A. Stutz and Harlan A. Depew, Palmerton, Pa., to The N. J. Zinc Co., N. Y. City.

Production vat pigment dyestuff paste by dissolving vat dyestuff in sulfuric. No. 2,026,623. Maurice H. Fleysher and James Ogilvie, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production vat color pigments of the indanthrone series. No. 2,026,637. Frank Willard Johnson, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production titanium pigments containing also an oxide of the group cerium, thorium or zirconium. No. 2,026,862. Joseph Blumenfeld, Paris, France, and Max Mayer, Karlsbad, Czechoslovakia, to Krebs Pigment & Color Corp., Newark, N. J.

Production zinc sulfide by reacting zinc amalgam with sulfur. No. 2,027,440. Samuel Kremen, N. Y. City.

* *Includes patents from "Patent Gazette," Nov. 19 through Jan. 11, inclusive.*

Resins, Plastics, etc.*

Production laminated composition material. No. 2,021,571. John H. Victor, Wilmette, William A. Heinze, Chicago, and Joseph B. Victor, Oak Park, Ill., to Victor Manufacturing & Gasket Co., Chicago.

Production artificial products by treating polymerized organics with chlorine. No. 2,021,763. Walter Bauer, Darmstadt, Germany, to Rohm & Haas Co., Philadelphia.

Production regenerated artificial structure by shaping a hydroxyalkyl cellulose xanthate solution and reacting with a coagulating agent. No. 2,021,861. Leon Lileinfeld, Vienna, Austria.

Manufacture of shaped artificial articles. No. 2,021,864. Leon Lilienfeld, Vienna, Austria.

Production pigmented nitrocellulose plastic comprising black carbon pigment, nitrocellulose, copper butyl phthalate, and a plasticizer. No. 2,021,949. Harry E. Stone, Jeffersonville, Pa.

Production moldable composition comprising formaldehyde treated mixture of casein with poly alcohol and poly acid condensation product. No. 2,022,001. Harold S. Holt to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production resinous reaction product of a non-cellulosic polyhydric alcohol and reaction product of organic polybasic acid and a cellulose derivative. No. 2,022,011. Caryl Sly to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production of resinous product by mixing urea-formaldehyde condensation products with phthalimide and then reacting. No. 2,022,233. Carleton Ellis, Montclair, N. J., to Unyte Corp., N. Y. City.

Production molding powder comprising cellulose acetate mixed with synthetic resin. No. 2,022,383. William Henry Moss, London, England, to Celanese Corp. of America, a corp. of Del.

Production of synthetic resin by reacting a phenol ether sulfonamid with formaldehyde. No. 2,022,389. George W. Seymour, Cumberland, Md., to Celanese Corp. of America, a corp. of Del.

Production new condensation products from natural resins. No. 2,022,456. Josef Pinapfl, Krefeld-Uerdingen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process of coloring synthetic resin articles by softening surface and surface dyeing with a water soluble dye. No. 2,022,710. Gustavus J. Esselen, Swampscott, Mass., to The Specialty Guild, Inc., Convent, N. J.

Apparatus for saturating sheet material. No. 2,023,019. George P. Heppes, Chicago, Ill., to The Patent & Licensing Corp., Boston, Mass.

Method and apparatus for making fibrous sheet material. No. 2,023,273. Charles W. Leguillon, Akron, Ohio, to The B. F. Goodrich Co., N. Y. City.

Production resin acid derivatives by reacting various compounds with resin compounds in presence dehydration catalyst. No. 2,023,337. Otto Nicodemus, Frankfort-am-Main-Hochst, and Otto Wulff, Hofheim-am-Taunus, Germany, to I. G., Frankfort-am-Main, Germany.

Production resinous reaction product obtained by polymerization of cracked petroleum distillate with a polyhydric alcohol. No. 2,023,495. Charles A. Thomas to Monsanto Petroleum Chemicals, Inc., both of Dayton, Ohio.

Production heat-hardenable resinous phenol-formaldehyde condensation products which are soluble in acetone. No. 2,024,212. Ernst Elbel and Fritz Seebach, Erkner, near Berlin, Germany, to Bakelite Corp., N. Y. City.

Production para-coumarone resins. No. 2,024,568. Karl Henry Engel, Leonia, N. J., to The Barrett Co., N. Y. City.

Production phenol-paraformaldehyde resinous composition and method of casting. No. 2,025,538. Roy H. Kienle and Paul F. Schlingman, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Production synthetic resin by compounding totally cured resin with another mixture. No. 2,025,539. Roy H. Kienle, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Production resinous composition by heating an ester wax with glycerol in presence of an alcoholysis catalyst and then heating with phthalic anhydride. No. 2,025,612. Ernest A. Rodman, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production arylated esters and synthetic resinous composition. No. 2,025,642. Merlin Martin Brubaker to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production of resins by the aluminum chloride synthesis. No. 2,025,738. Stewart C. Fulton, Elizabeth, and John Kunc, Roselle Park, N. J., to Standard Oil Development Co., a corp. of Del.

Production sulfur containing plastic materials comprising reaction product of glycerol dichlorhydrin and an alkali polysulfide. No. 2,026,875. Carleton Ellis, Montclair, N. J., and William P. ter Horst, Wayne, N. J., to Ellis-Foster Co., a corp. of N. J.

Production condensation product by reacting acetylene with an organic compound partially hydroxylated and using a basic catalyst. No. 2,027,199. Walter Reppe and Ernst Keyssner, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production of resins from phenols and aldehydes. No. 2,027,337. Adolf Heck to Cook Paint & Varnish Co., both of Kansas City, Mo.

Production condensation products by heating polybasic carbon acids and ricinoleyl alcohol. No. 2,027,351. Walther Schrauth, Berlin-Dahlem, Germany, to Deutsche Hydrierwerke Aktiengesellschaft, Berlin-Charlottenburg, Germany.

Production plastic composition moldings of the vinyl resin type. No. 2,027,961. Lauchlin M. Currie, Lakewood, Ohio, to National Carbon Co., Inc., Cleveland, Ohio.

Production odorless phenolic-aldehyde resinous product. No. 2,027,988. Gustave E. Landt, Norristown, Pa., to Continental-Diamond Fibre Co., Newark, Del.

Rubber*

Production chlorinated rubber by introducing chlorine into vulcanized latex. No. 2,021,318. John McGavack, Leonia, N. J., to U. S. Rubber Co., N. Y. City.

Production elastic fabric coated and bonded with rubber. No. 2,021,352. Warner Eustis, Newton, Mass., to The Kendall Co., Walpole, Mass.

Method of treating reclaimed rubber. No. 2,021,961. Walter C. MacFarlane, South Gate, Cal., to The Xylos Rubber Co., Akron, Ohio.

Manufacture of rubber printing plates using a sheet of bichromate and gelatin mixture. No. 2,022,183. Theodore C. Browne, Hinsdale, Ill.

Production of vulcanized rubber filaments, tubing, etc., by extrusion of vulcanized latex concentrate. No. 2,022,462. Harvey J. Elwell, Newton, Mass., to Vultex Corp. of America, Cambridge, Mass.

Production stabilized halogenated caoutchouc. No. 2,022,614. Gerhard Balle and Franz Grom, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Production colored unvulcanized rubber which will not deteriorate on standing. No. 2,022,887. Harry G. Kiernan, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production rubber bonded abrasive article containing an insoluble fluoride. No. 2,022,893. Richard H. Martin to Norton Co., both of Worcester, Mass.
Production vulcanized rubber by mixing rubber stock with N-nitrosoarylaminoethyl arylenethiazyl sulfide. No. 2,022,953. Clyde Coleman, Passaic, N. J., to U. S. Rubber Co., N. Y. City.
Production rubber sheeting for garment use containing agents capable of neutralizing acid emissions from body. No. 2,023,251. Jacob Stein, Brooklyn, N. Y.
Production rubber sheeting material for use in sanitary garments. No. 2,023,252. Hugh M. Mosher, N. Y. City, to Jacob Stein, Brooklyn, N. Y.
Production rubber sheeting wearing apparel. No. 2,023,253. Jacob Stein, Brooklyn, N. Y., and Hugh H. Mosher, Grantwood, N. J.
Process making cellular, sponge-like rubber goods. No. 2,023,296. Geoffrey William Trobridge, Sutton Coldfield, England, to Dunlop Rubber Co. Ltd., London, England.
Production hard rubber coating. No. 2,023,582. Louis B. Haines, Baltimore, Md., to Western Electric Co., Inc., N. Y. City.
Production rubber vulcanization accelerator by reacting carbon disulfide on preformed aldehyde derivative of a Schiff's base. No. 2,024,470. Clayton Olin North to The Rubber Service Laboratories Co., both of Akron, Ohio.
Vulcanization of rubber by treating with sulfur derivative of a diaryl amine. No. 2,024,477. Winfield Scott, Nitro, W. Va., to The Rubber Service Laboratories Co., Akron, Ohio.
Abrasive wheel comprising rubber to which outside abrasive surface is bonded by a protein-latex composition. No. 2,024,591. Frank H. Manchester, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.
Production rubber impregnated fiber articles or sheets. No. 2,024,600. George A. Richter and Milton O. Schur to Brown Co., all of Berlin, N. H.
Method accelerating rubber vulcanization using during process a mercaptothiazole with either ammonia or an amine. No. 2,024,605. Lorin B. Sebrell, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilimington, Del.
Method determining rubber content of latex. No. 2,024,617. John S. Ward and Samuel R. Gehman, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.
Production plastic rubber derivative. No. 2,024,987. Tirey Foster Ford, Akron, Ohio, to The B. F. Goodrich Co., N. Y. City.
Production chlorinated rubber. No. 2,025,017. Eugen Mollney to firm of Chemische Fabrik Buckau, both of Ammendorf, Germany.
Production vulcanization accelerator comprising tetra-aryl substituted thiuram sulfide. No. 2,026,256. Waldo L. Semon, Silver Lake Village, Ohio, to The B. F. Goodrich Co., N. Y. City.
Method preserving rubber using reaction product of alkali-metal upon a ketone-aromatic amine condensation product. No. 2,026,386. Louis H. Howland, Nutley, N. J., to U. S. Rubber Co., N. Y. City.
Production vulcanized rubber products using a catalytic antioxidant effective to inhibit oxidation. No. 2,026,442. Albert A. Somerville, Flushing, N. Y.
Production rubber antioxidant using reaction product of a biphenylene oxide amino derivative and an aliphatic aldehyde. No. 2,026,517. Albert M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.
Preserving rubber by treating with condensation product of an aliphatic aldehyde with a diarylamine. No. 2,027,001. Winfield Scott, Akron, Ohio, and Horace G. Byers, Washington, D. C., to The Rubber Service Labs. Co., Akron, Ohio.
Method accelerating vulcanization of rubber. No. 2,027,184. Wilhelm Lommel, Leverkusen-Wiesdorf, and Rudolf Schroter, Leverkusen-I.G. Werk, Germany, to I. G., Frankfort-am-Main, Germany.
Process for dissolving rubber in the production of paints, varnishes, and insulating products. No. 2,028,068. John Patrick Henharen, Durban, Union of South Africa.
Process of rubber vulcanization. No. 2,028,086. William C. Calvert and Howard I. Cramer, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Textile, Rayon*

Viscose and cuprammonium cellulose spinning solutions producing soft-lustre cellulosic products. No. 2,021,849. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.
Production artificial materials by reacting viscose with halogen derivative of polyhydroxylic alcohol. No. 2,021,862. Leon Lilienfeld, Vienna, Austria.
Production of artificial materials by shaping viscose-organic acid ester reaction mixture and reacting with coagulating and plasticizing agents. No. 2,021,863. Leon Lilienfeld, Vienna, Austria.
Production of colored pattern effects on textile materials. No. 2,022,-413. George Holland Ellis and John Allan, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.
Production artificial thread of cellulosic material. No. 2,022,838. Hans Altwegg and Armin Eichler, Freiburg, Germany, to Du Pont Rayon Co., N. Y. City.
Production cellulose acetate. No. 2,022,856. Clifford I. Haney, Drummondville, Quebec, Canada, to Celanese Corp. of America, a corp. of Del.
Process for delustering regenerated cellulose filaments. No. 2,022,961. Franz Hoelkeskamp, Wuppertal-Barmen, Germany, to American Bemberg Corp., N. Y. City.
Production stable wetting agent. No. 2,023,387. Benjamin R. Harris, Chicago.
Method of increasing tensile properties of viscose rayon. No. 2,024,041. James Willard Humphrey, Claymont, Del., and John Watson Pedlow, Chester, Pa., to The Viscose Co., Marcus Hook, Pa.
Apparatus for rayon production. No. 2,024,962. Earle J. Richard Beattey, Edgewood, R. I.
Production hydrocaoutchouc yarn using spinning solution of viscose, cuprammonium cellulose and a hydrocaoutchouc. No. 2,025,025. Thomas H. Byron, Elizabethton, Tenn., to North American Rayon Corp., N. Y. City.
Process impregnating textile fabrics by immersing in inert, non-aqueous solvent carrying metallic salt in solution. No. 2,025,072. Sidney G. Osborne to Hooker Electrochemical Co., N. Y. City.
Method lubricating natural or artificial fibers. No. 2,025,434. Aleidus G. Bouhuys to American Enka Corp., both of Enka, N. C.
Method treating natural or artificial fibers. No. 2,025,435. Aleidus G. Bouhuys to American Enka Corp., both of Enka, N. C.
Method increasing tensile properties of viscose rayon. No. 2,025,868. James Willard Humphrey, Claymont, Del., to The Viscose Co., Marcus Hook, Pa.

* *Nov. 19 through Jan. 11, inclusive.*

Production and treatment of cellulosic textile materials by treating with sulfonic acids in absence of mineral acids. No. 2,025,940. Henry Dreyfus, London, England.
Method improving tensile properties of artificial threads, yarns, films, etc. No. 2,025,962. William Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.
Method soaking natural silk fibers using bath of partially sulfonated high titre fats. No. 2,025,989. Philip Kaplan, Brooklyn, N. Y.
Process treating textile fiber with acidulated lead acetate solution, then spinning through sodium dichromate solution, thus preserving tensile strength. No. 2,026,190. George Henry Rhodes, Fall River, Mass.
Production artificial threads or filaments using cellulose as raw material. No. 2,026,730. Henry Dreyfus, London, England.
Treatment of textile fibers using a hydrogenated linoleic acid. No. 2,026,735. Augustus H. Gill, Belmont, Mass., to The Gill Corp., Cambridge, Mass.
Production artificial threads and yarns of organic cellulose derivatives. No. 2,027,419. Henry Dreyfus, London, England.
Production high molecular weight alkyl sulfates for use as textile wetting, dispersing, foaming and smoothing agents. No. 2,027,896. Heinrich Bertsch to firm H. Th. Bohme, Aktiengesellschaft, both of Chemnitz, Germany.
Use of cellulose derivative material in solution form as stiffening agent for fabric. No. 2,027,973. Russell Hamilton, Bloomfield, N. J., to The Celastic Corp., Wilmington, Del.

Water, Sewage Treatment

Method clarifying aqueous liquids by adding water-soluble sulfonic acids or their salts to form insoluble alkaline earth sulfonates. No. 2,025,715. John C. Bird, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.
Method treating wet sewage sludge. No. 2,026,366. Henry J. Stehli, Cedar Grove, N. J.
Method of sewage treatment. No. 2,026,969. Edward D. Flynn, New Rochelle, N. Y., to Oliver United Filters, Inc., San Francisco, Cal.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Activated Carbon. "The Recovery of Solvent Vapors by Adsorption—The Acticarbone Process," by E. L. Luaces. Solvent recovery by continuous and inexpensive means represents a question of almost universal interest in the process industries. An authoritative summary of data and experience written by a consultant for a large activated carbon producer. *The Rubber Age,* January, p199.
Coal. Proceedings at the official inauguration ceremony of I. C. I.'s Billingham hydrogenation plant. Coal hydrogenation, modern triumph of chemical research, is briefly described. Story of founding of this plant is a romance in vision and courage. A great article, one which should thrill every modern chemical engineer. *The Petroleum Times* (British), October 19, p407.
Drying. "The Drying of Solids," by Alfred H. Loveless. Reviewing plant problems and theory, author develops rigid specifications enabling plant operators to differentiate between actual drying and allied processes, such as evaporation. Thorough discussion of necessary equipment adds to practical value of this complete review. *The Industrial Chemist* (British), November, p427.
Equipment. "White Chemical Stoneware," by Felix Singer. Uses and advantages are discussed in an authoritative article. *The Industrial Chemist* (British), October, p376.
Equipment. "Modern Drying Machinery," by T. J. Horgan. Two types are discussed, mechanical separation, and vaporization. *Chemistry & Industry,* October 18, p913.
Fertilizers. "Disease and Its Relation to Fertilizers," by Lee Van Derlinden. This revealing article tells the part proper fertilization plays in public health. Food deficiencies, sources of so many health disorders, can be traced directly to improper or insufficient fertilization, the author believes. Revealing and authoritative, this article should be of great general interest. *Commercial Fertilizer,* November, p26.
Gas Dehydration. "The Southern California Calcium Chloride Brine Dehydration Plant," by B. M. Laulhere. Flow sheet reveals new arrangement of elements in this gas plant to facilitate gas transmission by more complete dehydration of the crude. *Western Gas,* December, p18.
Glass. "The Use of Cadmium Sulfide and Selenium in Making Ruby Glass," by William J. Mathews. Author suggests tests for quality of coloring materials and gives thorough description of plant problems. *Ceramic Industry,* December, p334.
Lacquers. "Historical Development of the Raw Materials Used in the Nitro-Cellulose Lacquer Industry, Part I," by J. S. Gourlay. Origin and progress of the nitro-cellulose paint and lacquer industry, another modern chemical triumph, discussed from the British point of view. *Synthetic & Applied Finishes* (British), October, p164.
Phosphate Rock. "Studies on Phosphate Rock as a Filler Substitute in Fertilizer Mixtures," by R. L. Smith. A discussion of the substitution of basic material for the usual inert filler in commercial fertilizers to off-set acidity caused by sulfuric acid formation. *Commercial Fertilizer,* November, p14.
Salt. "Salt—Pioneer Chemical Industry of the Kanawha Valley," by E. T. Crawford. Salt making equipment and methods of production are briefly outlined in this article, distinguished chiefly for its historical interest. *Ind. & Eng. Chemistry,* November, p1274.
Solvent Dry Cleaning. "Progress in Petroleum Solvent Dry Cleaning," by E. R. Clark, and "Dry Cleaning with Synthetic Solvents," by Harold Swarr. The question, petroleum solvent dry cleaning vs. synthetic solvent cleaning, was a discussion feature at recent National Institute Alumni Association meeting. These 2 articles present both sides of this vitally interesting current problem. *Cleaning & Dyeing World,* November, pp19&24.
Synthetic Rubber. "A Gigantic Test Tube," by V. A. Cosler. A brief history of Duprene manufacture and use, together with a description of du Pont's new 1,000,000 lbs. per year plant. *India Rubber World,* November 1, p31.

Bleaching Powder Production

Summary of New European Manufacturing Processes

WITH the glut of chlorine from the alkaline industries it is not surprising to find increased attention being given to more efficient methods of preparing bleaching agents such as sodium hypochlorite, bleach liquor, and bleaching powder. Although this last year there has been yet further increase in production and utilization of alternative bleaching agents, such as peroxides, perborates, etc., and although hydrogen peroxide of 99% purity is being transported in 8,000-gal. tank cars in the U. S., this great development does not mean than any appreciable decline in chlorine agents will necessarily take place.*

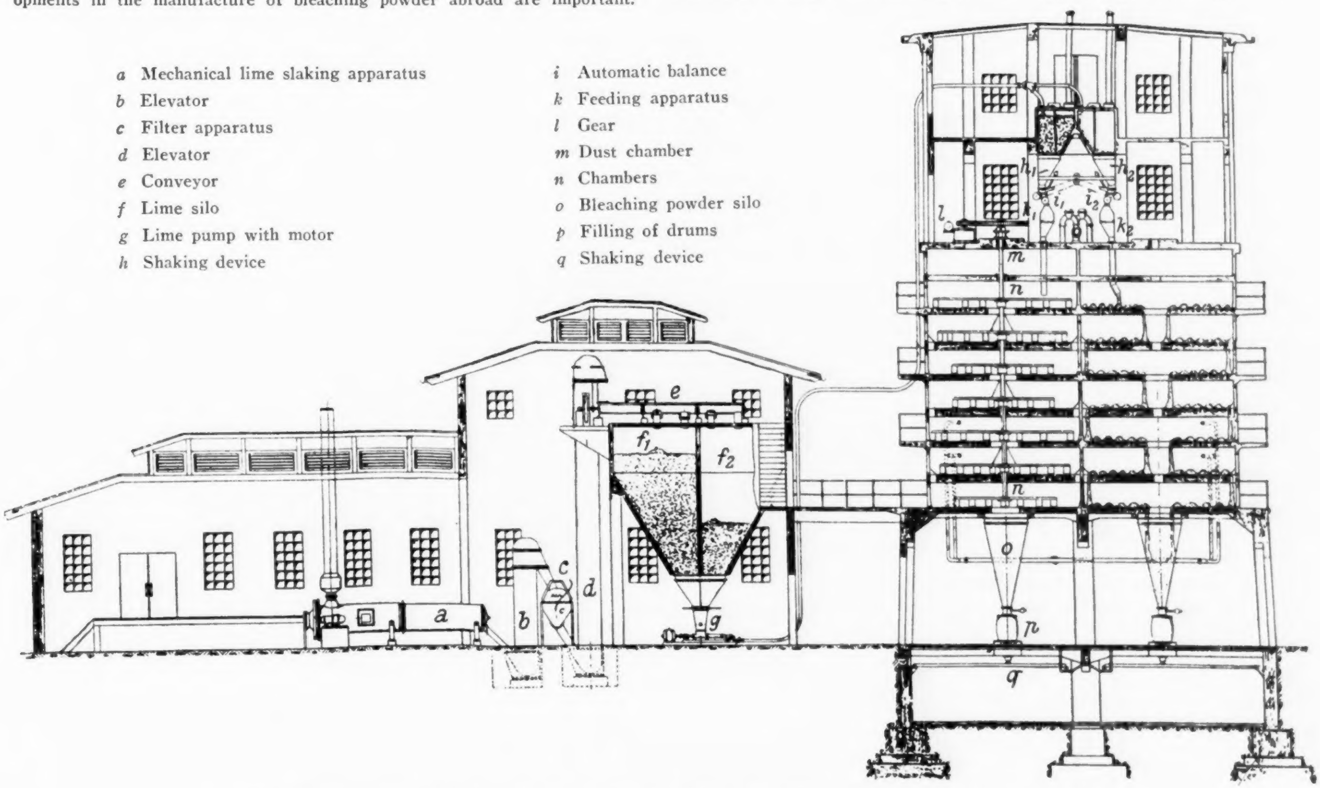
Bleaching powder still represents the cheapest form of agent available in commerce, and increased stability imparted in new forms means that certain objections to it have disappeared. Bleaching powder, moreover, may ultimately be required in large quantities for the purpose of decontaminating the towns of this country after poison gas attacks by enemy aircraft. Burnt lime with low magnesia and carbonate content together with electrolytic chlorine are raw materials available at low cost and in consistent quality, so that it is in production methods that improvements have taken place. The old chamber method, consisting in spreading the lime slaked to 26% water content in layers a few inches deep on floors, still survives in cases where gas of at least 30% chlorine content is used. Latter must be dry, admitted slowly, temperature of the chamber kept below 45° C., and the chlorine may conveniently be diluted with air until down to 40% by volume. But mechanical absorbers are the rule with gas below 30% chlorine, and are gradually displacing the older plants. In the U. S. a 12 ft. screw conveyor of cast iron has been in vogue for some time, the lime containing a slight excess of moisture and being worked in counter-current to chlorine diluted with air.

In Europe the tower plants introduced by Backman and constructed by Krebs and Co., of Oslo, have proved the most efficient of mechanical plants, an example in England being the installation at the works of the Staveley Iron and Coal Co. System of 4 hexagonal towers each holding 8 floors raked by mechanical arms is comparable in operation to the Herreshoff sulfur furnace, chlorine gas of any concentration from 10 to 90% being admitted in place of the air in sulfur burners, while the rakes move the lime outwards on one floor and inwards on the next. All parts of the plant are accessible, the arms being protected by mixtures of Stockholm tar and an inert solid. Lime passes continuously from the hydration unit via silos to the tower feed hopper, compressed air being the motive power. The top floor acts as distributor since the waste gas is withdrawn from the floor below; similarly, the lowest floor serves to stabilize the product since free chlorine is evolved during the raking to and fro in this section. Temperature can be adjusted for any desired condition depending on the chlorine content of entering gases, tubular coils through which brine or warm water can be circulated being fixed on the floors.

While the tower system can be adjusted so that no free chlorine is present in the exit gases, some concerns combine the production of bleaching powder with that of sodium hypochlorite, earthenware fans removing the gases to the earthenware absorption towers for preparing the sodium derivative. Where the Backman type of plant gains in efficiency is in the possibility of adjustment of clearance of scraper arms, rate of lime feed, and other conditions such as temperature, in order to meet any changes in technique or in type of gas utilized.

* Although the basic economics governing the markets for chlorine, bleaching powder and alkalies in the U. S. are different from those prevailing in England and on the continent and described in this article digested from British *Chemical Age*, Jan. 4, '36, p. 3, the technical developments in the manufacture of bleaching powder abroad are important.

a Mechanical lime slaking apparatus
b Elevator
c Filter apparatus
d Elevator
e Conveyor
f Lime silo
g Lime pump with motor
h Shaking device
i Automatic balance
k Feeding apparatus
l Gear
m Dust chamber
n Chambers
o Bleaching powder silo
p Filling of drums
q Shaking device



Section of a complete Krebs-Backman Bleaching Powder Plant, with lime slaking on the left.

In standard plants 8 tons of bleaching powder per 24-hour working period are obtained for each tower, over-chlorination and heating being cancelled. Labor costs are low, and plants producing up to 500 tons per week have been installed on the Continent. An increasing temperature of 35° to 40° C. is attained during the 1st stages of the chlorination process, this being lowered during the final stages; and since the powder issuing on to the last floor is treated with hot air to remove uncombined chlorine, there is no heat evolved due to chlorine absorption after packing—a distinct improvement on the chamber method product. For 10 tons of product energy consumption is round about 2 h. p., and raker-arms need renewal after nine months' service on the 3rd, 4th, and 5th floors.

G. Angel has shown that the condition of surfaces in reinforced concrete plants is an important factor. Inner surfaces should be smooth and without sharp corners, several towers being built together with one or 2 as reserve. Lime should be from mechanical hydrators and should not contain more than 0.5% excess moisture, while the highest temperature of 35° C. should be attained on the 3rd shelf upwards. As low as 1½ h. p. per 5 ton chamber is claimed, although Backman plants work with a lower consumption than this.

In Italy, a new product, or rather a form of bleaching powder made by novel methods, has been introduced under the name of "Sichlor." It was introduced by Carughl and Paoloni, and consists in chlorinating lime suspended in an inert liquid (like carbon tetrachloride) contained in jacketed reaction vessels. Stirring is used, temperature being that used in other processes (35° to 40° C.), and after the mixture has been cooled to 20° on termination of the reaction, the carbon tetrachloride is removed under vacuum together with some water, and a crystalline or amorphous product obtained according to the conditions used. It is claimed that the product is exceedingly stable since the carbon tetrachloride maintains a better contact and regulation of temperature. Product has no smell of chlorine, is denser and less hygroscopic than ordinary bleaching powder, and can be kept at temperatures up to 80° without decomposition. To produce 100 kgm. of product from 20 to 25 kw. of electrical energy and 10 kgm. of coal are required, the loss of carbon tetrachloride being 2.5 kgm.

This new Italian departure does not by any means exhaust the possibilities of new processes. I. G. has protected the idea of using a small proportion of carbon tetrachloride or other inert liquid to be added to the lime prior to chlorination in order to avoid formation of lumps and to control the rise in temperature, the liquid being removed from the product by vacuum. "High-test" bleaching powder containing up to 65% chlorine is on the market in the U. S., while Japanese products are claimed to contain even higher proportions. To increase the stability of the product the I.G. concern has introduced the use of a current of air at 160° to 180° C., while a 2nd method of the same company involves the addition of 0.5 to 1.0 parts of quicklime per one part of water in the product, a current of hot air being then used to reduce water content to about one per cent.

Metals and Alloys In Chemical Equipment

By Frederick A. Rohrman

Development in the treatment, production, and transportation of chemicals during the past hundred years has necessitated very great changes in chemical engineering materials of construction. A century ago most of the apparatus and equipment used in the manufacture of chemicals was constructed of wood, iron, copper, and various siliceous materials. Today, because of the much greater volume of chemical manufacture and because of the more complex and corrosive chemicals employed, other constructional materials are called into service. Some must be chosen not only for their corrosion resistance but also for their resistance to high temperatures.

No large chemical plant can hope to operate successfully without installations of nickel, silico-irons, nickel-chromium-steels, antimonyl lead, etc. It is quite possible that many of these will give way in the future to more suitable ones.

In choosing the proper metals for an installation or piece of equipment the following factors are generally considered important: 1. Cost; 2. Chemical or Thermal Resistance; 3. Physical Properties.

Cost the Primary Consideration

Cost is probably the most important. Were it not for their high cost, platinum and gold would find considerable use in various chemical operations; their high cost, however, precludes their use except in some isolated cases.

Second most important factor is the chemical or heat resistance of a metal. Obviously, if it is not resistant to the conditions imposed upon it, the material will corrode and ultimately be destroyed. Not only does the corrosion of a metal necessitate the early replacement of that metal but the products of corrosion may so contaminate the processed materials that they become unfit for sale or use. Sometimes a metal corrodes so slowly that it could be used a long time before replacement would be necessary, but its use is impractical because the products of the slight amount of corrosion contaminate the processed chemicals. A good example of this is in the manufacture of phosphoric acid for foodstuffs. From the point of view of equipment life, a certain chromium-nickel-molybdenum-iron alloy is satisfactory as material for the apparatus used in processing this acid. It is slightly attacked, however; and this results in a minute contamination which strict specifications forbid. The very interesting part of this story is that in its place a cheaper iron-silicon alloy is used which does not resist the solutions nearly so well but whose contaminating iron or silicon does not happen to be forbidden by the specifications. If a metal or alloy is not resistant to chemical or thermal action as specified for a certain use then it cannot be used.

Various other factors often have a great deal to do with the choice of material for construction. Very often a balance is struck between an expensive alloy which is resistant and a cheaper one which is not resistant. Many of the more expensive alloys have scrap value which is a good selling point over inferior and cheaper alloys. If the process is in rapid stages of development and improvement, a manufacturer is justified in being reluctant about installing permanent equipment. The same reasoning applies if the market indicates that a lower demand for a certain product is in sight.

In order that a metal or alloy may be fabricated into equipment it must possess properties which permit such fabrication. The desirable physical properties are: machinability, weldability, strength, workability, castability, etc. Some alloys, like the silicon-irons and high chromium alloys, can be successfully cast, but because they are hard and brittle cannot be machined or worked. Such alloys, which are not amenable to working, can often be cast and ground into intricate shapes and designs. Most of the industrial alloys can be worked and machined with comparative ease, however.

In order to obtain the greatest corrosion resistance some fabricated alloys must be properly heat-treated. In recent years weldability of a material has become more and more important. The advantages of a weld over a riveted or crimped joint should be obvious. Welding, however, often produces a strip along the weld which is more subject to corrosion than the surrounding metal. This difficulty is eradicated by proper heat treatment after the welding operation. Welding has become such a successful art that almost any metal or complex alloy of any size can be joined and finally heat-treated without impairing any of its physical properties or lowering its chemical resistance.

Chemical plant equipment is constantly being made larger and larger for the sake of efficiency and economy. Apparatus units are so large in many cases that they must be fitted together outside the fabricating plant. Most of this fitting is done by welding, followed by subsequent heat treatments in enormous annealing furnaces.

Metallurgists are not satisfied with any one scheme for classifying the various alloys. They speak of ferrous and non-ferrous alloys, however, and that classification seems as good as any for a starting point. For the purpose of this paper it may be justifiable to make a classification for those metals and alloys which have a special significance to the chemist and chemical engineer, as:

Ferrous	*Non-ferrous*
1. Steels, wrought, and cast iron	1. Aluminum
2. Silicon-irons	2. Copper, brasses, and bronzes
3. Chromium-iron ("stainless steels")	3. Lead
4. Chromium-nickel-iron ("18-8")	4. Nickel and Monel metal
	5. Nickel-chromium alloys
	6. Rare and miscellaneous metals and alloys

Over ninety-nine per cent. of all installations make use of the metals and alloys given in this classification, although there are a number of metals and alloys not included that find certain isolated uses in the chemical industry. It must be remembered that the use of a certain metal or alloy in a certain process does not necessarily imply that it is the only one that can be used or that it is the best in use. Manufacturers are constantly finding a certain alloy to be more economical or effective than another which they have been using for years.

Author then discusses in detail the electrochemical theory of corrosion and then elaborates on the ferrous metals and alloys, giving the uses for each in chemical equipment, discusses their formulae, etc.

Place of Iron and Steel

Iron and steel, being relatively inexpensive and possessing desirable physical properties, are used more, where conditions permit, than all the other metals and alloys put together. Iron and steel are used not only with the less corrosive substances but often with the strongest acids. This is due to 2 reasons, 1st, the low replacement cost for iron and steel equipment and 2nd, the fortunate passive behavior of iron in various media.

Aside from their use for general plant constructional equipment, iron and steel are used for equipment and apparatus designed for water and steam, weak electrolytic solutions, water-free gases and liquids, alkaline and ammonia solutions, solid and liquid caustic, molten aluminum, zinc and brass, petroleum and its products, and concentrated nitric and sulfuric acids, and their mixtures. The use of iron and steel for jacketing and reinforcing more resistant materials is steadily becoming more common.

Because of the ease of casting and because of its cheapness, cast iron is used where conditions permit. It finds uses in the manufacture of caustic pots, although the use of nickel or nickel-cast iron is considered to be better.

Wrought iron, though being gradually replaced by mild steel, possesses excellent resistance to water. This property is probably enhanced by its high silica content. On the other hand, the high silica content is responsible for the lack of resistance of wrought iron to molten alkali and strong caustic solutions.

The excellent physical properties of steel and its ease of fabrication make it a very desirable metal for construction where corrosion is not severe. The phenomenon of passivity permits most steels to withstand strong sulfuric and nitric acids as well as their mixtures (mixed acid). Nitric acid can be handled if it is over 65% HNO_3; below this concentration the iron ceases to retain the passive state and passes into solution very readily. Sulfuric can be handled in iron equipment when it is from 78-98% H_2SO_4. Sulfuric or mixed acid ($HNO_3+H_2SO_4$) containing more than 20% water attacks most steels because at these lower concentrations they are not rendered passive. Iron and steel containing much silicon are selectively corroded at the grain boundaries by sulfuric acid containing over 100% H_2SO_4 (oleum). This is due to the action of SO_3 on silicon, the latter being oxidized to SiO_2. It is therefore important that iron used with fuming sulfuric acid contain very little silicon.

The absence of electrolytic action in the absence of water makes it possible to employ iron or steel with dry chlorine, HCl, SO_3, bromine, etc. In the alkali-chlorine industry the wet chlorine is dried by sulfuric, and from this point the gas is transferred, compressed, and liquefied in steel equipment without danger of corrosion. Liquid HCl gas is also transported in steel cylinders.

Iron Electrodes are Common

The use of iron for electrodes in many electrolytic processes is very common, its chief use being as cathodes in the alkali-chlorine industry whereby salt solutions are electrolyzed. In the electrolysis of sodium hydroxide solutions for the production of oxygen and hydrogen, iron is sometimes used for the cathode.

Caustic pots for boiling down caustic solution are often made of iron alloyed with small amounts of nickel. The indications are that such additions improve the chemical resistance for certain purposes as well as the physical properties in general. The petroleum industry has some very severe corrosion- and heat-resistance problems which still remain unsolved. In the cracking of oils to produce lighter fractions, the use of the proper metal for the cracking tubes is a difficult problem. The unfortunate tendency for the tubes to burst is well known. The advantage of the straight steel or low alloy steel tubes, such as 5% chromium, lies in the fact that any tendency which they may have for failure announces itself by a swelling and the operator can then "cut them out."

Addition of silicon to iron produces no beneficial effects until about 13% has been introduced. Alloys of about 14% to 17% silicon seem to be the ideal compositions for corrosion resistance. The addition of over 17% silicon produces a slight lowering in chemical resistance.

Earlier Manufacturing Difficulties

The earliest manufacture of the silico-iron alloys was attended by a great number of difficulties, chiefly physical in nature. It is now known that the iron and the alloying agent must be low in impurities, such as sulfur and phosphorus, in order to produce successful castings. The casting temperatures as well as the cooling rates are also very important. The alloys are very hard and brittle and are difficult to machine or work. All fabricated equipment or apparatus must be cast into the desired form and then ground with abrasives to the proper fitting.

Duriron and Corrosiron are the trade names for the most important silico-iron alloys used in this country. The manufacturers of these alloys have been very successful in fabricating them into apparatus of desired shapes and sizes. Without doubt, these alloys are so widely used with so many corrosives that it would be simpler to list the general groups of corrosives they will not resist than those they will resist. These silico-iron alloys are, also, not recommended for very high pressures except for smaller apparatus.

New Silico-Iron Alloy Developed

Very recently a new silico-iron alloy appeared bearing a composition of 13.5 silicon, 3.5 molybdenum, and 1.0 nickel. This new alloy, called Durichlor, possesses exceptional resistance to hydrochloric acid and is probably the only alloy existing which resists this corrosive at all concentrations and temperatures. This resistance is attributed to a protective compound film which forms on the surface after a definite period of exposure. An interesting bit of information relative to this alloy is that it was not developed specifically for the purpose of resisting hydrochloric acid but was made in an attempt to improve the properties of Duriron, its HCl-resisting properties being discovered later.

Chromium and Chromium-Nickel Irons and Steels

These series of alloys are of relatively recent origin, dating from about the start of the World War. Today (known to the man on the street as "stainless steels") they are probably more common than any other series of alloys. Actually, they are far from being stainless; a more appropriate designation would be "corrosion and heat resisting" steels.

The alloys having the greatest importance in these series may be classified as follows:

Cr-Fe	*Cr-Ni-Fe*
Low Cr (11-15%)	High Cr—Low Ni (less than 3%)
Medium Cr (17-20%)	"18-8" (18 Cr-8Ni)
High Cr (24-30%)	High "18-8" (20-27 Cr-12-24 Ni)
	High Cr-Ni (27 + Cr — 14 + Ni)

Many other alloys of chromium, nickel, and iron do exist, but those above seem to be of the greatest importance.

Properties and consequent uses of these alloys may be explained without taking too many liberties with the governing fundamentals by saying that all these alloys are resistant because of their tendency to form insoluble oxide coatings. The addition of both nickel and chromium improves the chemical resistance, the chromium additions having no effect until 11% chromium is reached. As the nickel and chromium contents are increased the chemical resistance against most corrosives improves correspondingly.

With the straight chromium-iron alloys an increase in chromium (over 11%) improves the chemical resistance while the physical properties become poorer. On the other hand, the opposite effects are noted for the carbon contents of such alloys. It is therefore important to get a balance between the chromium and carbon percentages in order to have an alloy which will have good chemical resistance as well as desirable physical properties.

Unexcelled for Nitric Acid

These alloys show excellent resistance to nitric acid, being probably unexcelled for this purpose. They are also used in contact with various kinds of fruit juices, as well as with many of the weaker acids, such as acetic. The mineral acids such as hydrochloric, crude phosphoric, and sulfuric corrode these alloys readily, although phosphoric has little effect upon the higher chromium alloys.

The addition of about one to 3% nickel to the chromium-irons and steels tends to improve the physical properties greatly. A very large number of such alloys are used where high temperatures are employed. They can be used at temperatures around 1500° F. without danger of disintegration or warping.

The most important alloys of the entire chromium-iron and nickel-chromium-iron series are the "18-8" alloys containing 18% chromium and 8% nickel.

Intercrystalline corrosion is combated in these alloys in 3 ways: by limiting the carbon content to 0.07%; by proper heat treatment; or by the addition of small amounts of metals such as molybdenum, silicon, titanium, or columbium which tend to hold the carbide phase in solid solution. Such alloys are called "S" alloys (the "S" signifying soft); thus a straight "18-8" alloy might be called KA_2 or "18-8" steel, while the stabilized alloy might be called KA_2S or "18-8 S." It is only fair to mention that intercrystalline corrosion is not an inherent property of these alloys only, but exists in hundreds of other metals and alloys as well. Merely because the "18-8" alloys have enjoyed such wide use has the intercrystalline corrosion study centered upon them.

Many alloys exist having the composition 24 Cr, 12 Ni, or 24 Cr, 12 Ni, 3 Mo. Such alloys are fabricated for the sole purpose of obtaining more corrosion resistance than the "18-8" or "18-8-3" alloys can offer. The alloys of higher chromium-nickel composition, such as 36 Cr-20 Ni, or 35 Ni-15 Cr, find their chief use as heat-resisting alloys.

The "18-8" alloys find most extensive uses in the chemical industry. Recently, the "18-8-3" alloys have been found very useful in the manufacture of crude phosphoric acid and in the sulfite treatment of paper pulp. While these alloys are not quite as resistant to nitric acid as the chromium-iron alloys, they are better for sulfuric acid and find a much wider use in the food-processing industries because of their better physical properties. Again, it is probably easier to state which reagents attack these alloys rather than which do not. The halogens and their acids are the worst offenders, along with most boiling acids. The molten metals also attack these alloys. "Metals and Alloys in the Chemical Industry," by Frederick A. Rohrman, *Journal of Chemical Education*, January, p.53. First in a series of articles on materials employed in chemical equipment.

New Process for Resorcinol Manufacture

Publication of full specifications of English patent No. 439,053 (du Pont) discloses a new method for the manufacture of resorcinol. Benzene is sulfonated to the monosulfonate with sulfur trioxide in a medium of liquid sulfur dioxide and then to the disulfonic-acid stage with sulfur trioxide preferably in the absence of any diluent.

The resultant product is then hydrolyzed directly by reaction with a suitable hydrolyzing agent such as, for example, sodium hydroxide or other alkali metal hydroxide. Resorcinol is readily recovered by any convenient method, for example, by acidifying the reaction product followed by extraction. The resorcinol is obtained in high yield and in a relatively high state of purity.

The following example is given. All quantities are stated in parts by weight. Seventy-eight parts of benzene are dissolved in about 200 parts of liquid sulfur dioxide; 83 parts of sulfur trioxide are dissolved in enough liquid sulfur dioxide to make the volume of the solution equal to that of the benzene solution. A suitable sulfonator equipped with an agitator and a means of heating and cooling is charged with about 900 parts of liquid sulfur dioxide. Sulfonator and tanks containing the benzene and sulfur trioxide solutions are closed, and the sulfonation is carried out under pressure to prevent the escape of the diluent. An equalizing system is used to maintain the same pressure in the sulfonator and addition tanks.

Solutions of benzene and sulfur trioxide are added to the sulfonator at approximately the same rates, in order that any considerable excess of either material is avoided during the monosulfonation of the benzene. Addition of the reactants may be carried out conveniently in 4 hours, although this factor may be varied over a wide range. During this sulfonation, the temperature is maintained at 10-35° C.

After the addition of benzene and sulfur trioxide as above described is complete, 83 parts of sulfur trioxide are added. This 2nd portion may or may not be diluted with sulfur dioxide as desired. Sulfur dioxide is then removed from the sulfonation mass by distillation, the solvent being recovered. The sulfonation mass is finally heated to 100° C. to remove as much as possible of the sulfur dioxide, and to accelerate the disulfonation process. When sulfonation is complete, the mass is cooled and diluted with 3 times its weight of water. It is then neutralized by the addition of an equivalent quantity of sodium carbonate. The solution is evaporated to dryness, and the product ground.

The benzene-disodium-disulfonate obtained as above may be converted to resorcinol as follows: About 750 parts of caustic soda and 15 parts of water are heated in a cast-iron pot equipped with an agitator. When the temperature reaches 300° C., the ground disulfonate is slowly added over a period of about one hour, the temperature being maintained at 295-305° C. during this addition. Mass is then heated to 350° C. during about 30 minutes. Melt is cooled and dissolved in water. Sufficient sulfur dioxide gas is added to liberate the resorcinol from the

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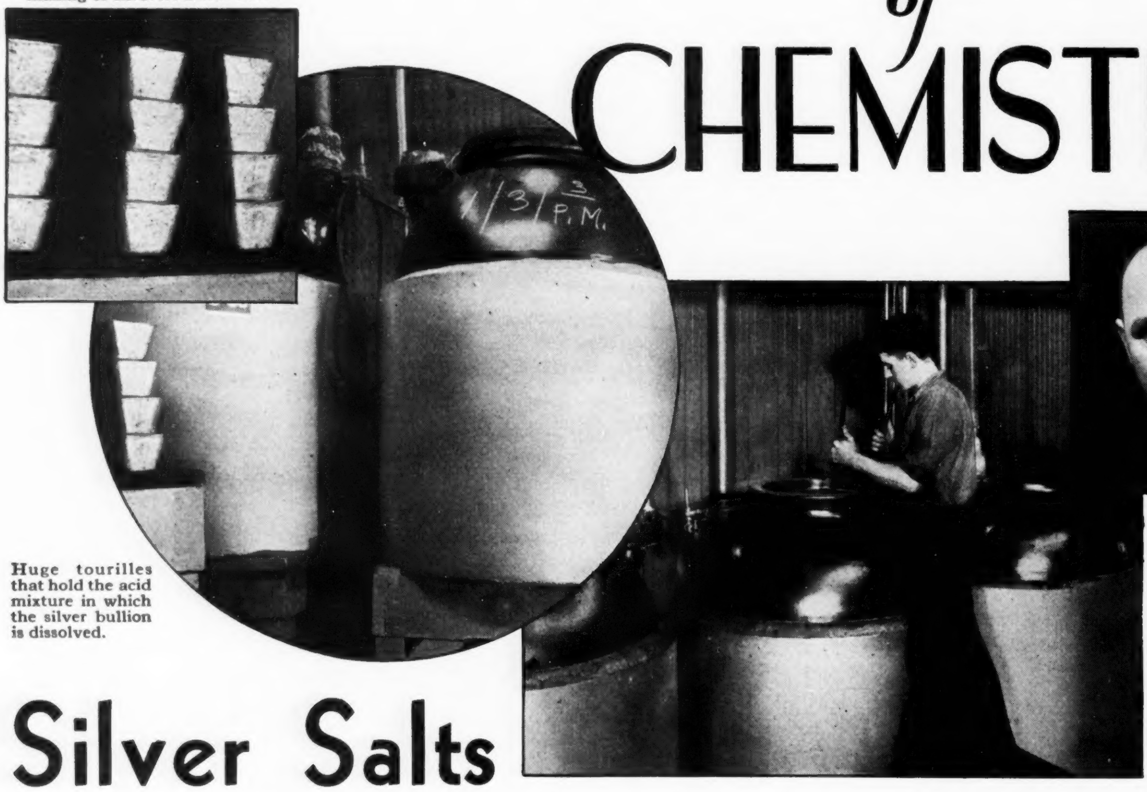

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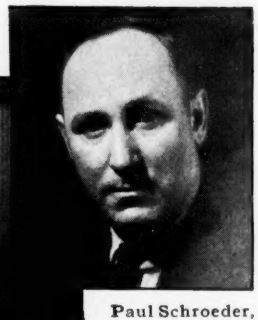

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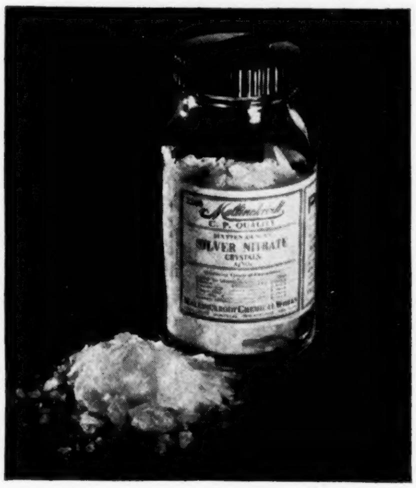

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sodium salt. The solid sodium sulfite, which precipitates during this acidification, is removed by filtration. The aqueous filtrate is then extracted with ether.

The ether extract is now distilled. The 1st fraction, consisting of ether, is returned to the operation for use in further extractions. The 2nd portion consists of water and a little phenol. From this fraction, a small amount of phenol may be recovered if economical. The 3rd fraction, distilled preferably under vacuum, consists of resorcinol. The product thus obtained is of satisfactory quality; and the yield varies from 40 to 60% of theory, based on the benzene used.

Resorcinol has been manufactured by sulfonating benzene with a large excess of strong sulfuric acid, neutralizing the sulfonation mass with lime, converting the so-formed calcium-benzene-disulfonate into benzene-disodium-*m*-disulfonate and fusing the reaction product with an excess of caustic soda. The sodium salt thus formed is treated with sulfur dioxide to liberate resorcinol and is extracted with ether. The disadvantage of these methods is the necessity of using a large excess of sulfonating acid, this excess forming no useful by-product, and greatly complicating the subsequent procedure. The new method provides an additional use for sulfur dioxide. British *Chemical Trade Journal*, Jan. 10, '36, p.24.

Industrial Chemicals

Shawinigan's Operations Described

Operations at the Shawinigan Co.'s plant in which over 1,000,000 cu. ft. of acetylene per day are utilized for the manufacture of acetaldehyde, acetic acid, acetic anhydride, vinyl acetate, and other products, the plant having a capacity of about 17,500 tons of glacial acetic acid per annum, were described recently by Dr. F. A. Mason before the Leeds Section of the British Institute of Chemistry.

In England, said Dr. Mason, the process is worked to a smaller extent at Billingham, but a great part of the glacial acetic acid required for the acetyl cellulose industry is prepared near Hull by British Industrial Solvents, Ltd. In this case the necessary acetaldehyde is prepared by catalytic dehydrogenation of ethyl alcohol over a heated silver-gauze catalyst; the greater part of the aldehyde is then oxidized by air in presence of a manganese catalyst, the total capacity of the works being some 10,000 tons glacial acetic acid per annum. A further portion of the aldehyde is converted into aldol by treatment with dilute caustic soda, the product dehydrated to crotonaldehyde, and the latter catalytically hydrogenated to *n*-butyl alcohol, the present output being of the order of 1,500 tons per annum.

Trisodium Phosphate Manufacture

British *Chemical Trade Journal*, Jan. 10, '36, reports a new process for the manufacture of trisodium phosphate recently patented in Germany by the Chemische Werke Albert. Usual drawbacks in the customary methods—namely, incomplete reaction, presence of pyrophosphate, etc., are said to be overcome in the new method. In the new process, disodium phosphate is reacted with sodium carbonate in the presence of the salts, oxides, hydroxides or carbonates of the trivalent heavy metals. The process may be combined with the preparation of hydrated alumina. In an example given, the aluminous raw materials are dissolved in technical phosphoric acid. Solution is separated from the insoluble silica, and is then treated with the quantity of sodium carbonate necessary to convert the whole of the phosphoric acid into trisodium phosphate, and the dissolved aluminum into sodium aluminate. Liquid is then evaporated to dryness, residue calcined and re-dissolved. Insoluble iron residue is filtered off and the trisodium phosphate separated from the sodium aluminate.

Production of Sodium Arsenite

Sodium arsenite is usually made by reacting a solution of either caustic soda or sodium carbonate with arsenious oxide and then evaporating the liquid, or, alternatively, by taking a dry mixture of caustic soda and arsenious acid, and pouring on to it sufficient water to form a solution.

A modified process, patent protection for which has recently been granted in England to Lunevale Products, Ltd., of Lancaster, and M. Fitzgibbon, aims at the production of a substantially dry sodium arsenite-containing composition in no stage of which is an excess of water present in the reaction mass. The invention (E.P. 438,022, complete specification accepted Nov. 11, '35) consists in producing a composition containing sodium arsenite, and more particularly such as is adapted for insecticidal or fungicidal purposes which comprises bringing together caustic soda and white arsenic in the substantial absence of water in any greater proportion than is necessary for ensuring as complete reaction as possible between the caustic soda and white arsenic.

Invention further extends to a process in which to the reaction product, which preferably is in pulverulent form, there is added a proportion of a material adapted to impart moisture-resisting properties to the composition; for instance, stearic acid or other higher fatty acid, zinc stearate or other metal salt of a higher fatty acid, ordinary rosin or resinates made by heating rosin with oxides of metals, paraffin wax, ozokerite or other mineral waxes, or petroleum residues of high melting point. Further, there may be incorporated with the composition a proportion of an inert filling agent.

Plant Operation

Disposal of Oil Field Brines

Most desirable approach to the problem of disposal of oil-field brines is through study of the technical considerations, giving proper weight to the economic and social factors on an impartial basis. This is the conclusion of the Bureau of Mines, in a preliminary report recently published which deals with the disposal of oil-field brines in the Ritz-Canton oil field, McPherson County, Kansas.

Return of brine to the subsurface salt-water-bearing formations is one method by which positive disposal of brine is accomplished. Such subsurface disposal is not always possible, but where the producing formation has porous streaks and other attending conditions are favorable, large volumes of brine may be returned to the formation successfully upon proper preparation, such as settling, filtering, and possible chemical treatment to prevent precipitation of iron and salts in the well which tend to seal the pore spaces of the rock.

Miscellaneous

Developments in '35 in Zinc and Compounds

Frank G. Breyer, Singmaster & Breyer, consultants, N. Y. City, summarizes the developments in the zinc field in '35 in *Mining and Metallurgy*, January, '36, as follows: In the field of Metallic Zinc: (1) Construction of further continuous vertical retort smelting capacity in the U. S. and Germany. (2) Expansion of fractional distillation capacity in the U. S. (3) Great expansion in the zinc-base die-casting industry in the U. S. and abroad. (4) Wide acceptance of heavy galvanizing by the steel industry. (5) Construction of the 1st commercial wire electroplating plant for putting on heavy coats of pure zinc. (6) Firm establishment and appreciable expansion of the practice of using zinc dust as a reducing agent in the organic chemical industry.

In the field of zinc compounds: (1) Further decrease in the use of zinc oxide in rubber compounding. (2) Wider appreciation of the value of leaded zinc oxide in paint. (3) Threat of titanium-inert combinations to lithopone in the bulk whitening field. (4) Threat to titanium oxide of zinc sulfide as the better value where concentrated whitening power is needed.

Plant Safety

Soybean Oil Plant Explosions

Explosive hexane gas ignited by a minor dust explosion caused the destruction of the soybean processing plant of Glidden, Chicago, Oct. 7, '35, chemical engineers of the Dept. of Agriculture report. Eleven employees were killed and 45 injured in the explosion, which caused a property loss estimated at $600,000. An electric motor on one of the flaking rolls in the bean preparation room "kicked out" several times before the explosion occurred, federal investigators learned. Apparently the flash from a minor dust explosion at this flaking roll ignited an accumulation of hexane gas.

Most of the gas is believed to have accumulated in a large and open tank room in which ingredients used in the processing of soybeans were mixed. This gas passed from the extraction room into the adjoining tank room possibly through a pipe for carrying condenser water. The preparation room in which the soybeans were ground and flaked was separated from the extraction room by a fire wall. Both rooms adjoined the tank room.

"Investigations show that the danger of explosions in soybean processing plants can be reduced if special efforts are made for the safe use of solvents which are generally recognized as inflammable and capable of generating explosive vapors," says Doctor Price. "Consideration should also be given to the practicability of installing instruments which give warning upon detecting explosive vapors." He also points out that dust explosion hazards may be created during the grinding and processing of soybeans. Soybean dust when mixed with air in proper proportions ignites easily and under certain conditions may cause a serious explosion.

A Combustible Gas Alarm

A new device which protects oil refineries, chemical factories, and other places from explosions of inflammable gases was described at a meeting of The American Institute held Jan. 22nd in the auditorium of the Metal Products Exhibits, Rockefeller Center, N. Y. City. "Gases in War and Industry" was discussed by Lt. Col. A. Gibson, Corps Area Chemical Officer, U. S. Army, and Murray D. Smith, Davis Emergency Equipment Co. Mr. Smith, in describing the various appliances used for protecting industrial workers from poisonous and explosive gases, demonstrated publicly for the 1st time an instrument known as the J-W Combustible Gas Alarm which continuously analyzes the air at any desired point and indicates at all times the amount of any inflammable gas that may be present. Should the concentration of the inflammable gas rise so high that the resulting gas-air mixture becomes combustible or explosive, instrument can sound an alarm and start up ventilating apparatus or other protective equipment.

Cyanide Antidote Announced

A means of combating cyanide poisoning is reported by *The Modern Hospital*. New antidote, evolved by the Lilly Research Laboratories in Indianapolis, consists of a combination of sodium nitrite and sodium thiosulfate and the technique of application—successive injections of the 2 solutions made intravenously, with a repetition, in case of relapse, of one-half of the quantity of each.

Safe Handling of Mercury

November issue of *National Safety News* contains Industrial Data Sheet D-Chem. 17 on the subject of mercury. Those who handle mercury or expose workers to its toxic effects should read this data sheet carefully. Devices for the detection of the presence of mercury are to be had and are quite simple in operation.

Poisoning by Olefines Reported

Chemiker-Zeitung reports a case of chronic industrial poisoning by olefines. The worker concerned had been engaged for some time in a process in which solid paraffin was cracked for the preparation of olefines. The poisoning took the form of severe liver disease, and was attributed as being most probably due to continued exposure to unsaturated ethylene hydrocarbons. By restriction of fats in the patient's diet, and by the injection of glucose-insulin, a considerable improvement was obtained.

Electrochemical

New Swiss Phosphoric Acid Process

The Swiss Fonte Electrique S.A., Bax, has developed the following phosphoric acid process, which was described before the Societe Vandoise des Sciences Naturelles and digested in *L'Engrais*, '36, p.15:

A mixture of natural phosphate, quartz and coal dust is fused in an electric furnace, proportions selected to obtain a slag with the following percentage composition: Silica, 35 to 38; ferric oxide, 2 to 3; alumina, 2 to 10; calcium oxide, 48 to 56; and phosphorus pentoxide, 0.5 to 1.5. Slag of this composition has a low melting point. Phosphorus liberated during the fusion is burnt to phosphorus oxide at the surface of the furnace, and the oxide is carried with a slight excess of air and with the gases proceeding from the reduction, 1st through a dust chamber and then into a special chamber, where it comes into contact, by means of an atomizer, with a spray of phosphoric solution. It then passes into a tower, down which trickles a solution of phosphoric and, finally, into 2 electrostatic precipitators of the Cottrell type.

Object of the atomizer is the hydration of the phosphorus oxide coming from the furnace. It consists, in principle, of a large but very narrow chamber, in which a thick mist of concentrated phosphoric produced by a centrifuge is constantly falling. Centrifuge disc rotates at 3,000 revolutions a minute. Feed for the phosphoric is at the center of the disc, and the construction of this centrifuge was the most difficult problem. It is now made of chemical stoneware, and is driven independently. Tower is 7 meters high by 2.50 diameter. It is lined internally with refractory bricks. Acid collecting at the bottom is distributed by a stoneware pump to 7 scrubbing towers. Cottrell precipitators consist of 2 chambers, each 4 meters long and 1 meter broad, electrodes being silver wires.

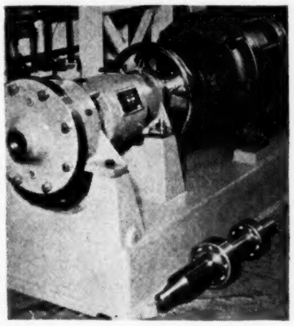
Manufacture by this process necessitates certain precautions. The phosphorus, as it leaves the furnace, must be as free as possible from dust. Hydrofluoric acid in the rock used should, as far as possible, be prevented from volatilizing with the phosphorus. This is effected by limiting the proportion of silica in the fusion mix, as very acid slag will not retain fluoride. A concentrated acid should be obtained at as low a cost as possible. The last-mentioned objective is achieved by the counter-current system adopted, the acid from the Cottrell tower being passed in turn through the scrubbing towers and through the hydrating chamber.

It was early noted that the phosphoric anhydride produced by the furnace method, probably owing to the high temperature of its formation, is in a vitreous allotropic modification only slightly soluble in water, but soluble in concentrated phosphoric acid. This property of the oxide considerably complicated the 1st trials.

New Equipment

Colloid Mills with Haynes Stellite Parts QC 325

A feature of the Chemical Exposition was the number and variety of sizes of separation equipment. The new centrifuges, for instance, are made up, on order, to fit any need. They can be supplied in a large number of sizes, forms, and materials. Colloid mills, too, have been greatly improved. One line of mills features a protective layer of Haynes Stellite on the mill rotor and of the nickel steel driving shafts. This alloy is resistant to chemical action as well as to the wear from the abrasive action of the material in the packing gland. The colloid mill rotors and stators can be supplied either in hardened steel or hard-faced with non-ferrous alloy. In a chemical plant in the East which has been running its colloid mills steadily grinding lithopone in a neutral aqueous solution, rotor and stator surfaces protected by the alloy have lasted 5870 hr. Previous tests showed that the estimated life of plain steel rotors and stators did not exceed 4 weeks or 672 hr.



Small Pump for High Pressures QC 326

There has long been a great need for a small pump to handle fluids at a relatively high pressure and at the same time in small quantities. To fill the gap that exists between the mechanical lubricator type and the rotary centrifugal type, there has been developed a miniature triplex plunger reciprocating pump. Depending upon the speed of the pump the capacity may be varied from about 15 to 120 gals. per hour. Power required by the pump is small, such that a ¼ horse power electric motor will operate the pump at 60 gals. per hour capacity and 200 lbs. pressure.

New Equipment for Cast Resin Cutting QC 327

Improvement in a machine for cutting cast resin plastics gives a much closer control on dimensions, etc.

Furnace Draft Controller QC 328

A complete self-contained furnace draft controller requiring only a draft connection to the furnace and a supply of compressed air at approximately 35 lbs. pressure has been developed.

Pressure and Temperature Control QC 328b

For pressure and temperature control, applications not requiring a record of the factor under control, there has been developed an indicator-controller which may operate either a diaphragm motor valve or an air-operated control drive. This controller is housed in a 13″ diameter round casing and may be mounted either flush on a panel or on a wall or column.

Respirators QC 329

A new automatic double chemical-cartridge rubber respirator fitted with 2 1-oz. cartridges of activated coconut charcoal, is announced. These respirators are designed and made for the protection of men exposed to paint spray, light fumes, vapors, and all kinds of dust.

Magnetic Separator QC 330

A new magnetic separator, 12 in. in dia., known as type "V Stearns" high duty magnetic separator, has recently been placed on the market. This machine embodies a number of new design and construction features for removing minute magnetic particles from fine powdered material before shipping.

Economical Dust Collection QC 331

What is claimed to be the most practical and simplest operating dust collector ever built, is called "The American Dustube Collector." It is simple in design, with no efficiency lost, but rather greater effectiveness gained. Heart of the Dustube Collector is the long tube made of special woven fabric best suited for filtering of ordinary dust, and this fabric can be changed to suit the specific installation. Tubes are hung from racks in the ceiling. Self-acting dust seals hold the tubes to the bottom, without clamps, bands, or intricate devices.

Pipe Insulation QC 332

A new type of pipe insulation for cold lines known as Rock Cork Pipe Covering has the same basic material as Rock Cork Sheets which have been widely used to insulate cold storage rooms and refrigerated equipment for over 25 years. Like the sheet form, the new covering is made of specially waterproofed rock wool, thus being mineral in composition and inherently permanent in character. Most important feature of the material is the factory-applied waterproofed jacket which provides, in addition to the unusual moisture resistance of the material itself, an absolutely waterproof hermetic seal against the infiltration of moisture-laden air—the most common cause of failure of low temperature insulation.

Powerful Laboratory Stirrer QC 333

To meet the insistent demand for a more powerful, variable speed, low priced, non-sparking laboratory stirrer, the Lab-Mix Sr. has been evolved. It is a beautiful, sturdy and well built piece of equipment which is most useful for making emulsions; dissolving dyes, gums and resins, waxes and bitumens, pyroxylin, cellulose ethers, casein, glue, gelatin, starch, salts; extracting crude drugs and herbs, oil seeds, complex organic materials, etc.

Seamless Chromium-Nickel Tubes QC 334

Commercial production of seamless tubes and pipe of a highly alloyed steel containing 25% chromium and 20% nickel is reported. These products are available hot-finished in sizes up to 6″ outside diameter and cold-drawn in smaller sizes.

Metallographic Developer QC 335

As a companion piece to the Bausch & Lomb Electroplater's microscope, a large plating supplies house has perfected a metallographic polisher to be used for preparing a specimen for the measurement of plate thickness.

Steam Trap with Novel Features QC 336

For removing entrained air from cold steam systems a new air eliminator has been developed which utilizes the famous Spencer Thermostatic Disc which takes the place of the usual thermal strip in blast traps. In the cold position, disc curves out and away from 3 large auxiliary ports on the side of the inverted bucket. Air can then pass rapidly through the trap. The eliminator remains wide open until the critical temperature (which accompanies live steam) is reached. It then snaps abruptly to the closed position, tightly covering the ports. Trap then operates normally.

Chemical Industries,
25 Spruce St., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 325	QC 331
" 326	" 332
" 327	" 333
" 328	" 334
" 328b	" 335
" 329	" 336
" 330	

Name ....

Title .... Company ....

Address ....

Bulk Packaging

Bureau of Explosives Hearing on Drums

Recommendation by the Manufacturing Chemists' Association covering convex heads on drums of 25 gal. or greater capacity, designated as Type 5E, was passed at a Bureau of Explosives' hearing in N. Y. City late last month. Proposed amendment to I. C. C. regulations represents a joint recommendation of the M.C.A. and the Steel Barrel Manufacturers' Council. Investigations by these 2 organizations have shown that convex heads make drums more durable and rugged. Proposal calls for drums to be used for liquids with flash points between 80 and 20° F. Minimum convexity of the heads must be 5/8 in. for 25 to 35 gal. drums and maximum of 3/4 in. for larger drums, with the proviso that the head shall not extend beyond the chime (rim) of the container. Drums of Type 5E are widely used, and many shipping concerns are already using the convex head exclusively.

Proposal for a new type drum, designated as Type 5J, single-trip drums for liquids of flash point below 20° F., was shelved pending further presentation of data on size and construction of the drum. The M.C.A. has spent considerable time and money investigating the construction of single-trip drums for this class of liquids, and has concluded that a drum of 16 gauge steel throughout, and similar construction to Type 5E, would be entirely satisfactory and at the same time somewhat less expensive for shippers now using other type drums. Indications point to acceptance of the proposed drum by the Bureau as soon as the mass of data accumulated by the M.C.A. has been presented at a future meeting of the Bureau of Explosives.

The M.C.A. was represented at the Jan. 28 meeting by Warren N. Watson, association secretary, and T. P. Callahan, Merrimac, member of Steel Barrel and Drums Committee.

Shifting of Merchandise in Transit

Published with the object of cutting down the great amount of damage to merchandise caused by shifting while in transit, a booklet has been issued by the Operations and Maintenance Dept. of the Association of American Railroads under the title of "Recommended Rules for the Loading, Bracing and Blocking of Freight." The booklet details completely the proper securing of freight, the suggestions and rules in the text being graphically set forth in the drawings and diagrams which largely make up the publication.

Booklets & Catalogs

Chemicals

A588. American Cyanamid, Agricultural Division. January-February *American Hortigraphs & Agronomic Review* stresses early spring application of fertilizers, particularly important to fruit growers. Notes on proper fertilization of pastures and haylands are included.

A589. American Cyanamid. New booklet describes use of granular "Aero" Cyanamid plowed under with cover crop to manure and sweeten the soil.

A590. American Cyanamid. How to use "Aero" Cyanamid in fertilization of fruit.

A591. American Cyanamid. Direction for using granular "Aero" Cyanamid.

A592. American Cyanamid. Recent release discusses uses of "Aero" Cyanamid in control of weeds, diseases, and insect larvae.

A593. J. T. Baker Chemical, Phillipsburg, N. J. *The Chemist Analyst*, January, more fine, brief items of immediate interest to analysts. Laboratory suggestions included describe time- and labor-saving laboratory devices. Of particular interest is item on chemical identification of cellulose derivatives.

A594. Commercial Solvents. January *Alcohol Talks* relates alcohol's part in that most ancient of honorable professions, Embalming.

A595. Commercial Solvents. "Shellacol," the Handy Solvent. Characterized by agreeable odor, high solvent power. Can be used for any industrial purpose except anti-freeze, due to Government regulations.

A596. The Davidson Commission Co., Chicago. Valuable statistics of high and low records for fats, oils and by-products for the years '25 through '35. A really fine job of a much-needed statistical summary.

A597. Foote Mineral Co., Philadelphia. *Foote-Prints*, Vol. 8, No. 2, features "The Use of Lithium Chloride for Air Conditioning," by Dr. F. R. Bichowsky. Relation of chemistry to this rapidly expanding field is of timely interest, and the author is well acquainted with the physical chemistry of this product.

A598. Hercules Powder. Two-page insert in *The Hercules Mixer*, January, contains complete, well-arranged listing of Hercules products with short descriptions of properties and uses for each product. Announcement states that February issue will contain similar list of Paper Makers Chemical products, both lists then to be combined in booklet form.

A599. O. Hommel Co., Pittsburgh. January *Ceramic Forum* marks 45th anniversary of this important producer of chemicals for the ceramic industry.

A600. McLaughlin Gormley King & Co., Minneapolis. New 8 page booklet discusses Pyrocide 20, a standardized extract of pyrethrum flowers.

A601. McLaughlin Gormley King Co. "How to Identify and Kill Common Plant Insects." Interesting for garden or farm use.

A602. Merck. January, *The Merck Report*, continues presentation of the latest researches in physiological chemistry. Unusual list of tests popularly known by author's names, for chemical or microscopical analysis, is included.

A603. Philadelphia Quartz. January *Silicate P's & Q's* discusses use of silicates in fabrication of modern containers and storage equipment.

A604. Photo Crafts Laboratory (H. O. Bodine & Associates), Wantagh, L. I., N. Y. "Vere Best Photographic Chemicals," brief descriptions and properties of remarkably complete list of developers, desensitizers, accelerators, etc.

A605. Publicker Commercial Alcohol. Specifications and properties of company products are included in new booklet designed for use by technician, plant manager, and purchasing agent.

A606. Quaker Oats Co., Chicago. "The Furans, Chemicals from Oat Hulls," a fine discussion of by-product use. Properties and uses of furfural and associated compounds are fully discussed.

A607. Wishnick-Tumpeer. December-January *Witcombings*, brief items or company products interspersed with optimistic notes on current chemical news.

Monthly Price Lists

A608. Heyden Chemical. January list.

A609. Mallinckrodt. January list.

A610. Merck. January list.

A611. R. & H. Chemicals Div., du Pont. Quarterly price list, January.

A612. Schimmel & Co., N. Y. City. January list.

A613. Bakelite. January *Bakelite Review* shows how the "material of a thousand uses" can be worked in the home workshop. Many other striking uses of plastic materials are shown in this issue.

Equipment

A614. Bausch & Lomb Optical Co., Rochester, N. Y. "Polarizing Microscopes," applications and methods of use included with specifications and descriptions of 4 instruments. List of optical accessories is also given.

A615. Bausch & Lomb Optical Co. "Microscope Lamps for Routine and Research." Here are practical, specially designed illuminators for the wide range of this firm's optical equipment.

A616. Fansteel Metallurgical Corp., N. Chicago. The simple title, "Tantalum," introduces as complete and commercially satisfactory a treatise as we have ever seen. Stressing the element's applications to fabrication of corrosion-resistant chemical equipment, Fansteel has provided the chemical literature with a fine reference on uses and properties of this "rare metal with amazing properties of heat transference and . . . . resistance to destructive forces."

A617. Haynes Stellite, N. Y. City. "Haynes Stellited Valves," 8 page booklet, stresses possibilities of use with high temperature-pressure equipment.

A618. International Nickel. "Thermal Expansion Characteristics of Some Nickel Cast Irons," important to manufacturers and users of internal combustion engines or other equipment subject to wide temperature ranges.

A619. International Nickel. *Inco*, Vol. XIII, No. 3. Wealth of valuable, up-to-the-minute information on properties, uses, and recent research on nickel-iron alloys. Vivid flow-sheet illustrating protection of products and equipment in salt plants deserves special note.

A620. Jeffrey Mfg., Columbus, Ohio. Catalog 417, 400 pp., covers specifications for material handling equipment parts and alterations of chains, spiral conveyors, sprockets, elevators, and conveyor parts. Of particular interest to fertilizer producers.

A621. Jeffrey Mfg. Jeffrey-Traylor type material-handling electric vibrating equipment. Catalog 610, 64 pp.

A622. Leeds & Northrup, Philadelphia. Micromax Smoke-Density Recorders, indicate, signal, and record. Catalog N-93. Interesting facts on smoke measuring and sampling are included.

A623. Link-Belt. January *Link-Belt News* includes 2 items of particular interest to chemical producers. Items describe use of screw conveyors in handling nitrate of soda and use of American made equipment in new China gas producing plant.

A624. Lukens Steel, Coatesville, Pa. "Method for the Fabrication of Lukens Nickel-Clad Steel."

A625. M-R-H Laboratories, Dowagiac, Mich. "Color Matching Analysis," 4 page folder illustrating newly developed colorimeter which breaks down original colors to give positive analysis.

A626. Pangborn Corp., Hagerstown, Md. All metal frame Dust Collectors with cloth screens. Pamphlet offers Pangborn service to possible customers, and suggests Pangborn Bulletin No. 197 as preliminary survey for those interested.

A627. Precision Scientific Co., Chicago. "Apparatus for Testing Petroleum Products," new 80 page Catalog (No. 160) is a valuable addition to petroleum technology literature. Contains detailed specifications and references to governing A.S.T.M. standards.

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive the following booklets; specify by number: ....

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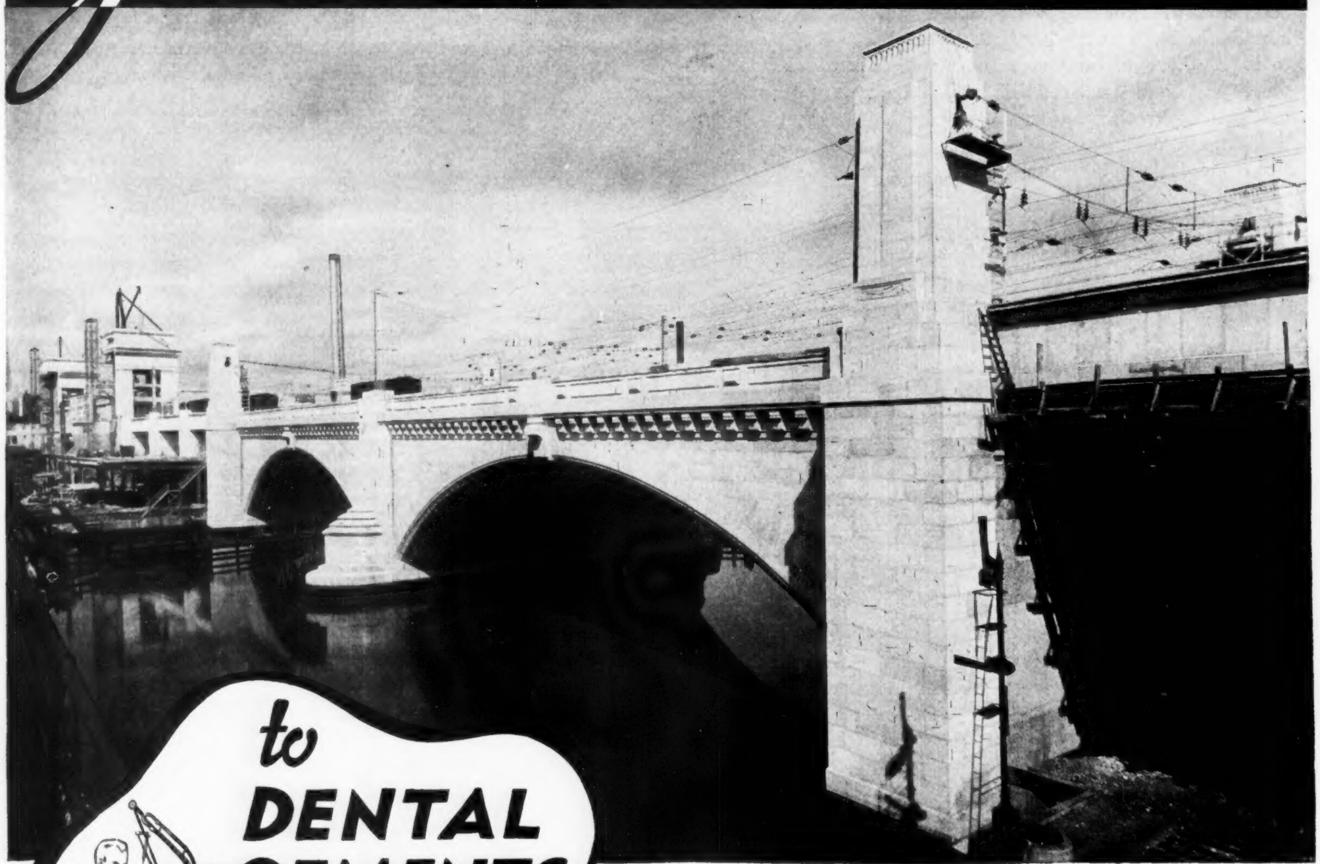
Name ....

Title ....

Company ....

Address ....

All information requested above *must* be given to receive attention.



Chemical Weed Killers

Market Economics and Latest Technique

THE principal chemicals employed in weed control are the chlorates, arsenical compounds, lead arsenate, sulfuric acid, iron sulfate (copperas), copper sulfate (blue vitriol), zinc sulfate, ammonium sulfate, ammonium thiocyanate, carbon bisulfide, ethylene oxide, sodium chloride, calcium chloride, oils and a small group of miscellaneous chemicals.

What are the economics of the situation? Broadly speaking, cultivation is cheaper than control through chemicals where large areas are involved. Therefore, price is a major consideration. Where small plots, such as lawns, are involved, price is usually of secondary importance.

Walter Conrad Muenscher in his recent book on weeds says, "As long as the cost of the most important herbicides remains at approximately the present level, their use on large areas, especially of cheaper land, will be prohibitive. However, on local areas, particularly when prompt eradication will prevent their spread, the use of herbicides not only is practicable but should be encouraged. Herbicides for the control of weeds along highways, railroads, tennis courts and other non-arable land, are both practicable and economical."

These generalizations are now open to some question in the light of the work being done in California by W. E. Ball and the Crop Protection Institute on the use of sulfuric for weed control on crop lands, which work was described in detail in an article appearing in CHEMICAL INDUSTRIES in March, '35, p220. There it is shown that spraying mustard infested barley fields is definitely economically feasible.

A chemical weed killer for application on large areas must be cheap and easily applied; must be poisonous to weeds but not leave the soil sterile or prevent the use of the soil for crops for long periods. Muenscher in his enlightening book divides chemical weed killers into two classes:

1. Selective sprays, those which will kill certain weeds without permanent injury to the crops or other plants among which they grow.
2. Chemicals which are absorbed through the leaves or roots when applied to the plants or to the soil in which they are growing.

The most widely used chemicals for selective sprays are sulfuric acid, iron sulfate and copper sulfate, with sulfuric now showing the most definite promise. Sodium chlorate is often used as a selective spray on lawns, in the strength of 1½ oz. of chlorate in a gallon of water at the rate of one gallon of the mixture to 100 sq. feet. This treatment is effective for chickweeds, ground ivy, speedwell and other broad-leaved, shallow-rooted weeds and for crab-grass in the seedling stage. For general spraying, the most widely employed dosage is one pound of chlorate to a gallon of water and sprayed at the rate of 200-300 gallons to the acre, depending upon the type of weed or weeds encountered.

Dry chlorate (any of the chlorates such as sodium or potassium chlorate or "Calcium Chlorate" may be used) is often applied at the rate of 200-300 pounds to the acre, often mixed with dry sand to obtain a more uniform application and the operation is best carried out in late autumn but before the ground freezes solid. Such application has several advantages including the reduction in the fire hazard attending chlorate use. It can be done in the fall when the harvest season is over, and through long leeching through the winter months the field may possibly be fit for use in the following summer. Usually but one application is all that is required, no spraying equipment is required, and the necessity of making up solutions is eliminated.

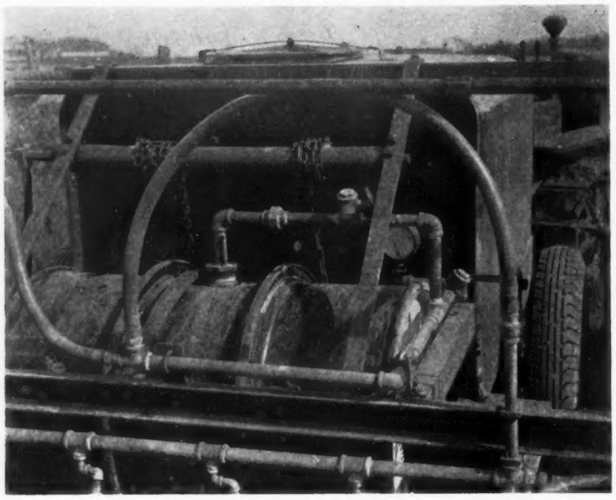
Among producers of commercial weed killers the use of sodium arsenite as the active ingredient is very popular. Comparatively expensive however, it sometimes limits such preparations to the treatment of small areas and it is best known as a garden weed killer, but considerable quantities are also used where larger acreage is involved.

One of the most popular stock solutions of acid arsenical spray is produced by mixing in the dry state four parts by weight of arsenic trioxide, one part caustic soda, and three parts of water. Heat is evolved and the mixture readily dissolves, but the operation is a "tricky one" for those not chemically trained. The most often recommended spray solution is one part of the stock arsenical solution to 100 parts by weight of water plus five parts by weight of concentrated sulfuric.

The use of lead arsenate as a weed killer has declined considerably of late, but the use of ammonium thiocyanate at the rate of two pounds to the gallon of water is coming in favor. It is highly toxic to plants, acts quickly, is non-caustic to the skin, is non-inflammable, absorbs moisture, is repellent because of its taste to stock and finally decomposes rather readily into ammonia and sulfur. On the other hand, recommendations for its use are still somewhat in the experimental stage. In some cases the application in the dry state is recommended.

Carbon bisulfide has been used but its highly flammable and explosive characteristics, together with the danger of inhaling the fumes, eliminate it from serious consideration. Ethylene oxide and propylene oxide have been suggested as weed killers, but the work is still largely in the experimental stage. They are easy to handle however, are toxic in low concentrations, and

Control of weeds in agriculture on a large scale and at low cost by chemical methods is now a reality in California and other states through the work of Ball and others at the California Experiment Station. Control of wild radish in grain with sulfuric acid.



View showing piping system for the application of sulfuric for weed control: a, union to hold acid-control disk; b, concentrated acid cut-off valve; c, winch for raising acid drum into place; d, ejector suction pipe through bung of concentrated acid drum. The bung is provided with a ¼-inch air vent.

are rapidly released in the soil and offer distinct future possibilities. Oils, common salt and calcium chloride are other materials that are extensively used and a detailed study of their properties should be made by the prospective producer of chemical weed killers.

A very serious threat to the producers of commercial chemical weed killers is the growing use of ammonium sulfate for the eradication of weeds in lawns, for as producers of this product point out, when properly applied, it not only acts as a weed killer but then supplies nitrogen to the soil.

The prospective producer of chemical weed killer must appreciate that there is no universal "cure-all"; that he must adopt that chemical which is most suitable for certain definite conditions; that he must have exact knowledge of just what his products will and will not do; that he must provide the user with specific rather than general directions for its use.

Organic Substances Hold Promise as Insecticides

Organic substances now seem to hold more promise as insecticides for the future than do inorganic, according to Lee A. Strong, Dept. of Agriculture, and its chemists are directing most of their research in this field to compounds that are either extracted from plants or synthesized from products derived from natural gas, petroleum, shale oil, coal, or plant materials. In his latest report for the Bureau of Entomology and Plant Quarantine, Mr. Strong, Chief of the Bureau, discusses several promising organic insecticides.

Perhaps the most important inorganic compound for which substitutes are needed, Mr. Strong says, is lead arsenate, long considered the most effective insecticide for the codling moth and other destructive fruit and vegetable pests. Lead arsenate is now losing favor with growers because it does not give as good control as is expected of it, and also because it may leave 2 objectionable elements—lead and arsenic—on sprayed or dusted food products. These residues must be removed to meet the requirements of Federal and State pure food laws. Large-scale tests now under way, and likely, in some cases, to run through the '36 growing season, it is hoped, will confirm the results, obtained under experimental conditions, which indicate that new materials may be effective.

Most promising insecticide of plant origin for use against the codling moth is nicotine. Search for a nicotine compound not easily washed off from sprayed fruit and foliage by rain—an objectionable feature of the nicotine compounds previously tested—led to the preparation of nicotine peat—a combination of nicotine and powdered peat. Peat, acidic in nature, combines with nicotine, a base, but in different proportions depending on the nature of the peat. Pre-treatment of most peats with acid improves their combining power, and appears also to increase the proportion of nicotine that is not soluble in water, which is a quality highly desirable in sprays for use against the codling moth. Preliminary tests show that nicotine peat is very poisonous to larvae of this insect.

Preparations containing rotenone are now used; certain disadvantages, however, bar their use for some types of insects. For example, derris is not effective against all insects. It is not effective against the celery leaf tier. It repels, but has no other effect, on the semi-tropical army worm. It does kill the common cabbage worm, however. Like many organic compounds, rotenone and related compounds are rather easily destroyed by sunlight. Although toxic to codling moth larvae in the laboratory, rotenone preparations, exposed to light and air in a thin spray film, decompose too rapidly for economical use. If the present search for a stabilizer is successful, Mr. Strong says, these compounds may become valuable orchard sprays.

There is little hope at this time of being able to synthesize, even in the laboratory, organic compounds having structures as complicated as those of rotenone and nicotine. Not much is known about the relation between structure and insecticidal value. Attempts to prepare compounds related to nicotine, but having a simpler structure, have been successful in just one case—that of neonicotine. Neonicotine was made in the laboratory before it was found in nature. It is now known to be identical with anabasine, discovered 1st in a Russian weed and this year in the roots and leaves of the tree tobacco of our Southwest.

Phenothiazine Most Promising

One organic compound that promises well as an insecticide—phenothiazine—was synthesized in the laboratory from sulfur and a commercially available dye intermediate. Even though little is known about the relationship between chemical constitution and insecticidal efficacy, chemists were led to this compound because they had learned that introducing sulfur, which is an insecticide itself, is likely to make organic compounds good insecticides.

Inorganic compounds have kept their place in the search for lead arsenate substitutes. Attention naturally went 1st to other compounds of arsenic. Calcium arsenate is one of the most promising lead arsenate substitutes, but, because of wide variations in manufacturing methods, results with it have often been inconsistent and unsatisfactory. The temperature at which calcium arsenate is made, the ratio between the lime and arsenic acid, and the size of the particles probably all have a marked effect on the action of this material. All these conditions are being studied.

New variations of Paris green, the standard codling moth insecticide 30 years ago, were prepared by adding to copper arsenite such acids as formic, propionic, butyric, palmitic, and stearic, in place of the usual acetic acid. Several of these "greens" are more effective than ordinary Paris green and are less soluble in water. Field tests with them are contemplated.

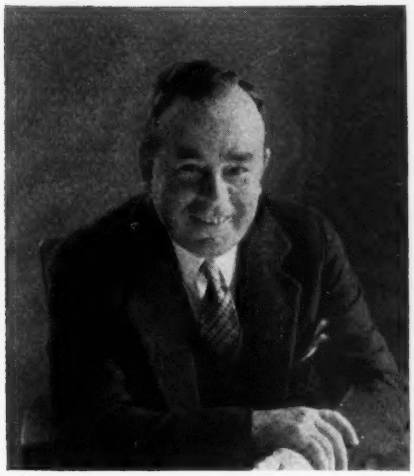
Solid CO_2 as a Rat Killer

According to the *Chemiker Zeitung*, solid carbon dioxide has been used successfully for some time past in the destruction of rats. Method employed is to place pieces of solid carbon dioxide about the size of a hazel nut in each of the rat holes, and to stop up the holes with broken glass and earth or gypsum. Application is best effected in the morning. It is stated that the rats are suffocated by the odorless gas without awakening.

Packaging for Profits

By J. L. Ferguson

President, J. L. Ferguson Company, Inc.



"THE smaller the package, the greater the profit." While exceptions exist, experience in packaging extending over many years and in widely diversified fields leads me to believe the statement is basically sound.

What reaction do most of us get from seeing a package of a specialty twice the size of the general run of packages of the same item? Unconsciously, we instantly feel that the material in the large-sized package must be of inferior quality. Usually such assumption is correct.

Quantity Not of Prime Importance

The consumer is not usually looking for a lot of goods, but is most interested in first, that the product does efficiently the job it is designed to do, and second, that it be delivered for use in the best form for application. My first advice to manufacturers introducing an item never before marketed is to determine costs accurately, then to figure a fair quantity for each size package, and then to reduce this in each case 10 per cent. This permits lee-way for increasing quantities should such a move appear desirable later on, but such action should only be taken in extreme cases.

In too many cases where a manufacturer brings out a competitive line already in the field, he simply follows the line of least resistance and practically copies his competitors' package sizes and style. Yet, in many instances with ingenuity, better understanding of the fundamentals of merchandising, the reaction of the consumer, and a more thorough knowledge of the various uses of his product, the new manufacturer could break with tradition and design a smaller package, but one which would prove more satisfactory from the customers' viewpoint.

Factors That Determine Size

Many factors enter into the determination of the proper size of containers. In the food field, the most desirable thing is to so design sizes that the quantity will be entirely consumed at once. This is obviously not so easy to do in the chemical specialty field, but that there is room for improvement we all know from a multitude of experiences in being forced into buying too much shoe polish, metal polish, paste, glue, automobile polish, household cements, etc., for our immediate needs and then finding out at a later time either that we have mislaid the package entirely or that the products have caked or hardened or evaporated. If we remember the brand we bought originally, we avoid it again if possible.

A smaller package would have proven more profitable to the manufacturer, more useful to the consumer, more likely to build repeat sales Producers of packaged items should, then, as a basic principle remember that the proper amount to put into a package is the amount practicable for one or a reasonable number of portions and based on the nature of the product. Forget, if you can, the fallacy of giving a lot for the customer's money—he doesn't want bargains so much as he wants service. Service, convenience plus sanitation have been the main reasons behind the trend from the "cracker barrel" period of the last century to the highly packaged era of today.

Manufacturers of packaged items should know the average length of time their packages will have to be in transit and stock after they are placed in consuming channels and what physical and chemical changes take place during these intervals. Will an emulsion stand up for 3 months? or 6 months? It may be that one which will stand up for 3 months is perfectly satisfactory for one product or one size package and entirely fatal for another product or a larger package.

But the manufacturer MUST KNOW and not guess. For example, if a cleanser package for household application holds 3 ounces, and it is used in one application, there is not much chance for the product to take on any serious change in structure. On the other hand, if the package is 30 ounces and is exposed 10 times as long, it may be seriously affected by atmospheric conditions.

Obtaining Shelf Attention

The average length of a package on a shelf is affected by many factors over some of which the manufacturer has no control. The producer of a nationally advertised brand has very little actual control over the retailer. One dealer may be progressive and turn his stock over rapidly, while another may not. But the manufacturer can protect himself to an important degree by having the right type and size of package, by having a package so designed that it will attract self or shelf attention and by advertising, dealers' helps, display cartons, etc. He may, if necessary, resort to the expensive system of having goods returned after they have been out a certain period of time.

A good general rule for packaged items is to use the largest face panel possible, consistent with the amount of the product and cost of container. This increases shelf advertising value. Great strides have been made in the depression years in package design. If I were asked to summarize what packaging experts have brought about, I would certainly say a much-needed simplifying of labels and many revolutionary improvements in the ease of application of the material.

Just because many concerns have gone in for package remodeling is no sane reason for you to follow their example unless there are sound reasons in back of your decision. If you do, bear in mind that you are undertaking a serious job; that the cost of the best experts is cheap compared to a packaging error, and that modifications after trade mark or design is established are hazardous.

We, who make packaging machinery, represent only a percentage of the total cost of any nationally distributed packaged product. At the same time, we have the opportunity of analyzing all sorts of packaging problems. From years of this varied experience, I conclude that most producers want a profit on every package, and that the smaller the package, the smaller the price, and the less noticeable is the included profit.

Scientific Furniture Polish Formulation

By Dr. Charles F. Mason

MAINTENANCE of finishes has received little attention from scientists except in the patent literature and polishing compounds have been left largely to practical men. Fifty patents which have been granted in 25 years show combinations containing toxic substances in high concentration, paint and varnish removers, unstable emulsions, and combinations of oils and solvents which will exert solvent action upon some and in exceptional cases all finishes.

To present the broadest point of view of the coatings prevalent today, all of which are not applied to furniture but to any or all of which a furniture polish may possibly be applied, the classification is submitted below.

Stains	*Varnishes*	*Paints*	*Lacquers*
Oil Soluble	Spirit	Water	Cellulose-
Alcohol Soluble	a. Alcohol Soluble.	Oil	Esters
Oil Varnish	b. Mineral Oil Soluble.	Enamels	Resins
	Baked and unbaked.		Gums
	Oil		Pigments

Naturally these vehicles may be encountered either as pigmented or unpigmented ones and in varying conditions of deterioration which necessitates taking into consideration the differences of hardness, fastness of colors, and resistance to solvents. The average furniture polish upon the market today will remove an oil soluble stain which is not protected by a superimposed film of other coating. Benzol and alcohols are detrimental to lacquer films and shellac; spirit varnishes with or without pigments like the cheaper synthetic resins dissolved in petroleum solvents will be damaged by any furniture polish which has ever been patented or made. Hence the time is ripe for the introduction of a little science into this field.

The ideal polish, besides possessing no detrimental effect upon the coating, should remove dirt and grease readily from the surface, restore the lustre and be nearly completely removable so as not to leave the surface in such condition as to hold dust or leave an objectionable odor. It should not contain alkaline compounds which are finish removers and the toxicity of all compounds used should be considered carefully. A comprehensive view of how patented products approximate this ideal may be obtained by consideration of the table shown where the components used are classed under the general headings listed in the first column.

Consideration of this table indicates that many materials have been chosen poorly, without any reason, and that some combinations will be detrimental to the finest finishes. The introduction of gums in the presence of solvents which will form varnishes may have been prompted by the desire to deposit a varnish film during the polishing operation; something which is physically impossible for obvious reasons. The presence of vinegar, wine, buttermilk, egg yolk, sugar and a water extract of mahogany sawdust was perhaps for the purpose of emulsification at a time when commercial emulsifiers were not available in the trade, or the early (successful) use of french dressing, an emulsion of an edible oil in vinegar, for finished and unfinished wood may have been the impelling motive.

The use of abrasives like powdered aluminum, chalk, diatomaceous earths, silica, magnesium oxide, starch, umbers, lampblack and even rouge is unnecessary and in some instances dangerous. The toxic compounds present are ether, acetylene tetrachloride, ethylene trichloride, benzol and mirbane oil which is the pharmacist's term for nitro-benzene. The introduction of ammonium hydroxide may have been for detergent purposes and if present in low concentration with a fatty oil, the soap so formed will aid in emulsification and the vapors of ammonia will not be objectionable.

Hard and soft waxes have been used only sparingly and in the majority of cases wisely, for when waxes are embodied with drying and non-drying oils they tend to increase the viscosity which is undesirable and retard the spreading and subsequent drying of any residual film of fatty oil. A combination of linseed oil, paraffin oil, rosin, beeswax and turpentine would, after evaporation of the turpentine, deposit a film of the three non-volatile components which would be hard to remove. Some very odd substances which are completely out of place are formaldehyde in the presence of raw eggs, alcohol and cottonseed oil; the formaldehyde would harden the animal membrane to an insoluble mass which would be suspended in the immiscible mixture of alcohol and oil. Others are sugar, sea salt, sulfur, asphalt, and antimony trichloride, the latter of which would immediately hydrolyze to form hydrochloric acid in solution and deposit a white powder of antimony oxychloride which could only act as an abrasive.

Essential oils in high concentration like lemon, cedar and pine may be attributed to the comparative low cost of these terpenes and, although they are of no particular advantage over turpentine except for the odor imparted, their use has been flaunted in advertising to a point where the unsuspecting public feel that they are buying lemon or cedar oil only when it is a mineral or vegetable oil which has been colored yellow or red. The early introduction of water in the form of fruit juices, wine and vinegar created a bad precedent in the trade, so that

No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Year	1907	1908	1909	1909	1910	1910	1911	1911	1912	1913	1913	1914	1914
Mineral Oil	NAPHTHA		KEROSENE	PAR. OIL	PAR. OIL BENZINE	PAR OIL		PAR OIL				BENZINE	
Drying Oil				LINSEED			RAW LINSEED	LINSEED		LINSEED	RAW LINSEED		RAW LINSEED
Non Drying Oil									COTTON SEED				
Gum	RUBBER ROSIN ELEMI	SANDARAC		SHELLAC SANDARAC GUM LAC			SHELLAC GUM				DRAGON'S BLOOD		
Alcohol			METHYL ALCOHOL	WINE		ETHYL	ETHYL	ETHYL METHYL	ETHYL	ETHYL METHYL			WINE
Treated Oil			SULPHONATED CASTOR										
Wood Distillate				TURP.	TURP	TURP.	VEN. TURP			TURP	TURP	TURP	
Base				AMMONIA							AMMONIA		
Acid					VINEGAR	VINEGAR		VINEGAR					VINEGAR
Wax		BEES										SPERMACETI	
Abrasive	AL POWDER							ROUGE					
Rare Solvents							ETHER				ETHER		
Emulsifier									EGG YOLK & WHITE				EGGS
Water													
Dye													
Odorant													
Miscellaneous	SULPHUR						BALSAM FIR	BUTTER OF ANTIMONY	FORMALDEHYDE				SUGAR

No.	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Year	1914	1914	1915	1915	1915	1915	1915	1916	1916	1916	1917	1917	1918	1919
Mineral Oil		PAR. OIL			PAR. OIL KEROSENE	PET OIL	GASOLINE	PAR. OIL KEROSENE			PAR. OIL		PAR OIL	
Drying Oil				LINSEED BOILED	LINSEED				BOILED LINSEED	LINSEED BOILED		LINSEED	LINSEED RAW	
Non Drying Oil														
Gum	SYNTHETIC			SHELLAC										
Alcohol		DENATE	ETHYL	ETHYL		METHANOL		ETHYL			DENAT			ETHYL
Treated Oil														
Wood Distillate				TURP		TURP.				TURP	TURP.			
Base		SODA												
Acid								VINEGAR				VINEGAR		
Wax	CHLOR NAPHTHALENE				BEES		BEES			BEES				BEES
Abrasive		PPTD CHALK ROUGE		TRIPOLI		PUMICE			SILICA MAGNESIA					
Rare Solvents	ACETYLENE CHLORIDE BENZINE		ACETONE								BUTTER MILK			
Emulsifier						EGG WHITE			SOAP					WATER EXT OF SAWDUST
Water	ETHYLENE TRICHLORIDE	WATER			WATER	WATER			WATER		WATER			WATER
Dye											OIL SOL.			
Odorant					AMYL ACETATE	CAMPHOR CLOVES SASSAFRAS CASSIA ROSEMARY CITRONELLA		MIRBANE		CITRONELLA	CEDAR	PEPPERMINT	LEMON	
Miscellaneous			CELLULOID					GLYCEROL BUTTER ANTIMONY			SALT			

Table continued at top of next page

No.	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Year	1919	1920	1920	1920	1921	1921	1921	1921	1922	1923	1923	1923	1923	1924
Mineral Oil		GASOLINE PAR. OIL			PAR. OIL		PAR. OIL	PAR. OIL		PET. OIL	LUB. OIL KEROSENE	PAR. OIL	KEROSENE PAR. OIL	PAR. OIL GASOLINE
Drying Oil	LINSEED RAW		LINSEED	LINSEED RAW		LINSEED BOILED			LINSEED BOILED					
Non-Drying Oil														
Gum			SHELLAC									MASTIC		
Alcohol	ETHYL		ETHYL	ETHYL	ETHYL			ETHYL				ETHYL		
Treated Oil										SULPHONATED OLEIC + TURKEY RED				
Wood Distillate	TURP.	TURP.		TURP.		TURP.	TURP.		TURP.		TURP.	TURP.		
Base				AMMONIA						AMMONIA	AMMONIA			
Acid	VINEGAR					VINEGAR	VINEGAR		ACETATE			VINEGAR		
Wax				BEES										
Abrasive	BLACK ANTIMONY	WHITING SPANISH	ANTIMONY											
Rare Solvents			AMYL ACETATE		AMYL ACETATE									BENZINE
Emulsifier								FRUIT JUICE	CIDER SOLIDS				ALKANET ROOT	
Water		WATER			WATER					WATER		WATER		
Dye					OIL SOL.			OIL SOL.						
Odorant		CITRONELLA	CAMPHOR				CAMPHOR	CITRONELLA	BENZYL ESTER		CEDAR	CITRONELLA	MIRBANE	
Miscellaneous											ASPHALT	ANTIMONY BUTTER		

No.	42	43	44	45	46	47	48	49	50	51*	52	53	54
Year	1924	1924	1924	1925	1925	1925	1926	1926	1926	1927	1932	1934	1934
Mineral Oil	BENZINE		KEROSENE	PAR. OIL		PAR. OIL		KEROSENE		KEROSENE		PET. OIL	PAR. OIL GASOLINE
Drying Oil		LINSEED BOILED	LINSEED		LINSEED BOILED			LINSEED	LINSEED	LINSEED	LINSEED		
Non-Drying Oil			CASTOR									CASTOR	
Gum					ROSIN				ROSIN				
Alcohol		METHYL			ETHYL METHYL								
Treated Oil													
Wood Distillate		TURP.	TURP.		TURP.	TURP.	TURP.	TURP.	TURP.	TURP.	TURP.		
Base				BORAX									
Acid		VINEGAR						VINEGAR		VINEGAR			
Wax	BEES PAR. STEARIN			HARD	BEES		PAR. BEES		BEES		HARD		
Abrasive	STARCH		UMBERS			WHITING	UMBERS LAMP BLACK				TRIPOLI		
Rare Solvents													
Emulsifier										EGG. W.		SOAP	
Water				WATER		WATER						WATER	
Dye							OIL SOL.						
Odorant								CAMPHOR					TILOCENA
Miscellaneous	SALT	SEA SALT			DRIERS								ASPHALTUM VARNISH

today competition forces one to use it and, in turn, soaps as emulsifying agents to keep the oils dispersed.

From this discussion it would appear that no combination of materials could even approximate the ideal for a furniture polish which is to be used indiscriminately by the public upon furniture and interior wood work. Such is indeed the case and in view of the fact that the non-technical public, especially servants, cannot distinguish between dried films, the label should contain definite instructions that the producer is not responsible for damage to finishes. However, three formulae of polishes which will not harm lacquer, oil varnish and spirit varnish coatings and will damage water paints, some spirit varnishes and stains only after long contact are given; the criterion being close observation of the rubbing cloth.

1.		2.		3.	
Cider vinegar..	17 lbs.	Cider vinegar..	17 lbs.	Paraffin oil ...	11 lbs.
Petroleum Vmp.	31 "	Petroleum Vmp.	31 "	Petroleum Vmp.	22 "
Turpentine	19 "	Turpentine	19 "	Linseed oil (r)	11 "
Alcohol Denat..	3 "	Linseed oil (b)	33 "	Water	54 "
Linseed oil (b)	14 "	Lanette wax ..	10 "	Soap	1 "
Linseed oil (r)	16 "	Water	90 "	Odorant	1 "
Cost $0.06 per lb.		Cost $0.05 per lb.		Cost $0.03 per lb.	
$0.42 " gal.		$0.35 " gal.		$0.21 " gal.	

The odorant may be any essential oil and the soap should be a neutral organic one like glycol oleate, stearate, etc., or any of the ammonium salts of the fatty acids. These may also substitute for lanette wax in formula 2. Formula No. 1 can be compounded by simple mixing while Nos. 2 and 3 require more care in that the soap must be dispersed in the water either hot or cold depending upon the soap chosen, and the oils after mixing should be stirred into the cold soap solution with rapid agitation. Stable emulsions are desirable and are demanded in some cases, but in others, producers make it a sales point to have a metastable emulsion and show the buyer that there is no abrasive in the lower layer of water. However, abrasives could be present and by careful compounding could be kept in the upper layer.

The nature of highly polished surfaces like metals, glass, wax and varnish films has been examined by physico-optical methods (high speed electrons and reflection diagrams) from which the conclusions were drawn that the degree of abrasion, plastic deformation in the surface, and levelling of the micelles in the surface were directly proportional to the speed and pressure of the polishing instrument. So, a furniture polish applied and subsequently buffed by hand can do little harm to a film, if no substances which exert a solvent effect are present.

New Spreader for Nicotine

A new liquid spreader for nicotine contains about twice the amount of active ingredients and is four times as effective as the commercial liquid potassium soap spreaders in the control of *Aphis rumicis* Linn., on nasturtium leaves.

In making the new spreader, the same oils were used as in the manufacture of commercial liquid soap spreaders. These oils are coconut oil and oleic acid. Coconut oil-tar oil combination diluted with water could not be used because a heavy flocculate formed. The oleic acid-tar oil combination mixed with water easily. No flocculate formed.

Formula for the tar oil-oleic acid combination is as follows:

SPREADER 385—FORMULA 1

5.00%	water
7.40%	potassium hydroxide (92% flakes)
44.30%	pine tar oil (sp. gr. 1.035)
10.00%	ethylene glycol mono-ethyl ether
33.30%	oleic acid
100.00	

The ingredients are to be added in the order given from top to bottom. The potassium hydroxide is dissolved in the water before the pine tar oil is added. This combination requires no heat. In the experiment, when the water was reduced to 3%, the water dissolved only a portion of the potassium hydroxide. It was necessary, therefore, to apply heat at 140° C. after adding the pine tar oil but before adding the solvent and oleic acid.

During the past year, a second formula has been used that permits an increase of pine tar oil and a decrease in solvents in the formula. Formula 2 has about the same effect as Formula 1. It is a cheaper spreader, mixes more readily with water, but is more complex. Each formula thus has advantages.

SPREADER 385—FORMULA 2

5.00%	water
7.40%	potassium hydroxide (92% flakes)
48.80%	pine tar oil (sp. gr. 1.035)
3.00%	iso amyl alcohol
1.00%	phenol (85%)
1.50%	ethylene glycol mono-ethyl ether
33.30%	oleic acid
100.00	

The same mixing directions given in Formula 1 apply to Formula 2. It was necessary to change the proportions of the solvents with different samples of tar oil and oleic acid.

A small amount of a fine dark precipitate resulted in the spreader when both Formula 1 and Formula 2 were used. The precipitate was filtered out in part of the testing work. No change in results was noted. Filtering was more effective when the temperature of the spreader was lowered to 40° or 50° F. The precipitate came out readily on coarse fast filters. Heat and agitation caused resolution of the precipitate.

The precipitate was reduced when materials such as creosote acids, pine tar acids, xylene, sulfonated castor oil, and glycerine were used. It was prevented when resin was substituted for a small but equal portion of both pine tar oil and oleic acid. In field tests about 20 to 25% of resin was used in the spreader.

The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.

Household Specialties

Picking Insecticide Convention Date

Secretary John H. Wright of the National Association of Insecticide & Disinfectant Manufacturers is asking members for an expression of opinion on the holding of the semi-annual Chicago convention on June 8, 9 and possibly the 10th also. The Edgewater Beach will again be the hotel.

President Eddy in a special bulletin to members has outlined the lines of new activity to be taken up by the Association.

To clarify the meaning of, and the work being done by, the committees on scientific specifications and standardization of disinfectants and insecticides, a new set-up has been created. This consists of (1) a General Disinfectant and a General Insecticide Committee made up of representative business men, of each group, to look after the general commercial aspects of each; (2) a Specifications and Standardization Committee for each group, made up of commercially-minded men to work out these commercial problems, and (3) a Methods of Testing Committee, for each group, *i.e.*, insecticides and disinfectants, made up of scientific men, to carry on the scientific work in each field.

In accord with the action of the Association, a new committee has been appointed to consider plans for cooperation with the Pacific Coast Insecticide Association.

Latest Developments in Fair Trade Legislation

The N. Y. Court of Appeals held unconstitutional section 2 of the State fair trade act in an opinion handed down Jan. 7th. Invalidated section comprises the provision that sale of a trademarked article by noncontracting dealers at prices lower than those specified by the manufacturer in contracts with other dealers constitutes a basis of action by any person damaged by such sale.

In Washington the Tydings bill for a Federal enabling act with relation to State fair trade laws was introduced into the Senate on Jan. 6th and is in form of an amendment to the Sherman antitrust Act which provides:

Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States or with foreign nations is hereby declared to be illegal.

Tydings bill would add to this sentence:

Provided, That nothing herein contained shall render illegal, contracts or agreements prescribing minimum prices for the resale at retail of a commodity which bears, or the label or container of which bears, the trademark, brand, or the name of the producer or of the owner of such commodity and which is in fair and open competition with commodities of the same general class produced by others, when contracts or agreements of that description but not related to trade or commerce among the several States or with foreign nations are lawful under any statute now or hereafter in effect in any State, Territory, or the District of Columbia in which such resale at retail is to be made, and the making of such contracts or agreements shall not be an unfair method of competition under section 5, as amended and supplemented, of the act entitled "An Act to create a Federal Trade Commission, to define its powers and duties, and for other purposes," approved Sept. 26, '14.

New Massachusetts "Poison Bill"

A bill (No. 757) has been introduced in the Massachusetts legislature which would prohibit the sale of caustic potash, caustic soda or lye in higher than 10% concentrations; oxalic or salt in higher than 10% concentrations; ammonia water in higher than 5% concentrations unless the package bears the word "Poison" conspicuously displayed and instructions given in case of accidental swallowing of or injury by such chemicals. Bill is before the Public Health Committee.

Bill No. 1101 before the same legislature deals with the sale of insecticides, fungicides, paris green or lead arsenate and states that they shall be in a container having affixed thereto in a conspicuous place on the exterior of the container, a printed label or tag in the English language, stating that the substance in the container is an insecticide, fungicide, paris green or lead arsenate, together with the name and address of the vendor of such insecticide, fungicide, Paris green or lead arsenate.

Copeland Bill Will Have Early Revival

Early introduction of the Copeland food and drug bill appears certain. Measure passed the Senate at the last session. Rep. Virgil Chapman (Ky.) is chairman of the subcommittee in charge of the bill. A proposal for amending the food and drugs act will be given careful consideration by the full house committee, Chapman stated on Jan. 9th.

Fumigators Seek Model Agreement Form

A committee of the National Association of Exterminators and Fumigators is working on model agreement or contract forms. William O. Buettner, secretary, 3019 Ft. Hamilton Parkway, Brooklyn, is a member of the committee and suggestions are in order, he reports.

Boyle Purchases Three-in-One Oil

Three-in-One Oil Co., maker of oil and furniture polish, and subsidiary of Sterling Products, Inc., Wheeling, W. Va., is sold to A. S. Boyle Co., Cincinnati, maker of Old English wax and Waxer Polisher, plastic wood and other specialties. A. S. Boyle is owned by American Products Co. Trade-mark "Three-in-One" will be retained.

Coopers Creek Enters Specialty Field

Coopers Creek Chemical, West Conshohocken, Pa., in reporting several important personnel changes (see News Section) announces that a complete specialty division has been established, manufacturing coaltar and pine disinfectants, sprays, including not only household insecticides, but live stock as well, along with horticultural sprays.

Glyco Offers New Synthetic Wax

Glyco Products, N. Y. City, is offering a new emulsifying agent, known as "acimul," a hard, wax-like solid, which the company describes as self-dispersible in hot water, forming stable creams or liquid emulsions according to the concentration. It is claimed that lemon juice, hydrogen peroxide, oxyquinoline sulfate and other materials generally difficult to hold in emulsion can easily be incorporated into greaseless creams by means of this new product.

Personal and Personnel

At the sales meeting of Magnus, Mabee & Reynard, Percy Magnus was inducted into the 20 Year Club.

T. B. Robertson Products' new Wisconsin representative is Charles Spicer. The Robertson organization manufactures soaps and chemical specialty items at a modern plant in Chicago.

Jack A. Dorland is now selling for Dow Chemical out of the N. Y. City office. He is specializing on raw materials for the sanitary field.

Wallace A. Bush, well-known in essential oil and aromatic chemical fields, joins the new organization, Charles Fishbeck & Co. Company has opened offices and laboratory at 119 W. 19th st., N. Y. City.

Huntington Laboratories, Huntington, Ind., appoints C. C. Hubbard as a consultant for its staff and the company's customers.

New Producer of Lavender Oil Reported

Plant Research Foundation, non-profit membership corporation, with offices at 2217 1st ave., Seattle, will produce lavender oil.

Penick Opens Soluble Gum Plant

S. B. Penick is completing a new plant for the manufacture of soluble gums at Hoboken, N. J.

Dixie Chemical Expands Facilities

Dixie Chemical, maker of a full line of disinfectants, soaps, insecticides, and polishes, is now in its own modern 4-story building at 222 Decatur st., New Orleans.

Lever Brothers Push "Lux"

One thousand-line advertisements in 4 newspapers and 500-lines in 31 were used by Lever Brothers, for Lux toilet soap advertisements to tie-up with the release of United Artists' "Strike Me Pink," a Samuel Goldwyn production starring Eddie Cantor.

Course on Packaging

The Lithographic Technical Foundation, Inc., 220 E. 42nd st., N. Y. City, announces 2 new sales courses, "The Marketing Procedures of Representative Manufacturers" and "Packages, Package Designing and Displays." Courses, each of which consists of 6 lectures, will begin on Feb. 10.

New Moth Repellent Marketed

Baltus Rolfs, Inc., West Bend, Wis., a new company, is producing a moth product, "Moth Wool."

Starts Production of Household Specialties

S. & G. Products is a new household chemical specialty maker with headquarters at 3731 W. Euclid ave., Detroit.

Borah Offers Bill on Price Control

Senator Borah is introducing Bill 3670 which would "make it unlawful for any person engaged in commerce to discriminate in price or terms of sale between purchasers of commodities of like grade, quality, and quantity."

Babbitt Opens New Broadcasting Series

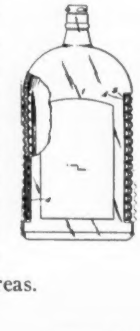
B. T. Babbitt Co., for "Bab-O," has started a new daily program of dramatic sketches, beginning with David Harum, Monday through Friday, 10:45-11 A. M., E.S.T. over the NBC-WJZ Blue Network. Blackett-Sample-Hummert, Inc., N. Y. City is directing it. Babbitt was sponsor of the famous "Little Miss Bab-O" program on NBC from Feb. 18, '34, to May 12, '35.

Coconut Processing Tax Restrained

Iowa Soap has obtained an injunction in the Federal Court in Cedar Rapids, Iowa, restraining collection of the 3c processing tax on coconut and palm oils.

Parsons Ammonia Patents New Bottle

Joseph Philbrick has assigned to Parsons Ammonia (large household ammonia bottler) patent for a bottle having a generally elliptical transverse cross section comprising arcuate relatively smooth front and rear faces and sides defined by longitudinally arranged grooves, sides being provided with transverse ribs extending between the longitudinal grooves so that when the bottle is grasped in the hand of a user the transverse ribs will provide resistance against longitudinal slippage of the bottle while the side defining longitudinal grooves will provide resistance against circumferential slippage of the finger tips about the elliptical bottle surface beyond the respective side wall areas.



Industrial Specialties

Plan Clarification of Sulfonated Oil Practices

The Sulphonated Oil Manufacturers Association has undertaken the preparation of informative data designed to standardize and clarify certain practices affecting relations between buyer and seller of sulfonated oils. Work of preparing the data is in the hands of several committees of the association.

Among the matters comprised by this undertaking, outstanding importance attaches to the compilation of explicit and specific nomenclature or grading of so-called "staples" and of standard methods of analysis. In connection with the latter phase, the association has published in a Handbook of Data Relating to Sulfonated (Sulfated) Oils and Other Products of This Industry, the methods of analysis recommended by the subcommittee on grading and analysis of sulfonated oils of the American Association of Textile Chemists and Colorists, these methods having been adopted as the official methods of the Sulphonated Oil Manufacturers Association.

Analytical methods published in the association's handbook comprise tests for moisture, inorganic salts, total alkalinity, organically combined sulfuric anhydride (titration and extraction-titration methods), total fatty matter, total sulfated fatty matter, total active ingredients, unsaponifiable matter, and free fatty acids. Work is in progress on the standardization of determinations of neutral fat, pH, ammonia, and on other tests. Results will be published in a form adaptable to inclusion in the handbook, this book being of the loose-leaf type with a special greaseproof binding. Improvements and revisions in methods comprised by the handbook will be furnished in similar form as they become available.

Carolina Aniline & Extract to Expand

Believing that the movement of textile processing plants to the South will continue, G. S. McCarty, president, Carolina Aniline & Extract, Charlotte, plans the erection of a new $40,000 plant on property recently acquired.

New Rayon Sizing Material

Announcement has been made of the development of a new sizing material for acetate and other synthetic warp yarns, to be known as Houghto-Size A. C., by E. F. Houghton & Co., Philadelphia.

Miller Forms Haas-Miller

Harry L. Miller, former vice-president and technical director, Quaker Chemical Products, is forming Haas-Miller Corp., 4th and Bristol sts., Philadelphia, to make textile oil products.

Revolutionary Soap Process

A revolutionary fat-splitting process which is said to reduce the soap manufacturing period from 30 hours to 3 hours and simplifies glycerine refining has recently been patented.

New Waterproofing Product Marketed

Dri-Cess, a new waterproofing solution that makes curtains, table linens, shirts and collars and wash dresses repellant to rain, fog, liquid stains, perspiration and dirt is now being offered by the Dri-Cess Co., Los Angeles, as a new business-getter for steam laundries. The advertising, which is to include business papers, magazines and newspapers, is handled by Chet Crank, Inc., Los Angeles.

Cal-ed Products Revives House Organ

Cal-ed Products, Cottage City, Brentwood, Md., is again publishing the "Cleanser," a publication designed to be helpful to dry cleaners.

Agricultural Specialties

Study of Bollweevil Control with Calcium Arsenate

Dept. of Agriculture, Washington, D. C., has just released Technical Bulletin No. 487 on "Bollweevil Control with Calcium Arsenate on Field Plots in Madison Parish, La., From 1924 to 1934," by M. T. Young, associate entomologist, Division of Cotton Insect Investigations, Bureau of Entomology and Plant Quarantine. The work is summarized briefly as follows:

Average annual increase in yield per acre for the plots dusted with calcium arsenate ranged from 10 lbs. in '24 to 742 lbs. in '26, with an average for the 15-year period of 356 lbs., or 30.2%. Difference in the square infestation of the treated and the untreated plots and the increase in yield in the treated plots were greatest in those years when the infestation was the heaviest.

In the years when it was necessary to start treatments early in the season, more applications were required than in the years when treatments were started later.

Tests made in '20 on early, intermediate, and late infestations showed that, although more applications were required for control, greater increases in yields were made in the plots where the infestations began early in the season. With later infestations more cotton was produced than in the early infestations in both treated and untreated plots.

Tests conducted in '27 on cotton planted at the usual time on unflooded land and planted late after flood waters had receded from the fields indicated that weevils emerging from hibernation concentrated in the older cotton, and that the younger cotton did not become heavily infested until weevils migrated from the older cotton. Concentration of migratory weevils was more pronounced in the western portion of Madison Parish in fields located nearer to unflooded hill land than in the eastern portion of the parish.

Tests conducted in '28 showed a greater weevil infestation in the untreated plots, and greater increases in yields in the treated plots, in cotton fields where cotton had been grown than in fields where cotton had not been grown in '27.

Two special control tests in '32 on cotton, growing in very fertile land, which continued to fruit unusually late in the season showed that the bollweevil could be controlled by calcium arsenate dusting and good gains made when the square infestation was very high and while field migration was in progress. The number of days with 0.3 inch or more of precipitation from June 21 to August 19, inclusive, showed a greater correlation with the average percentage increase in the yield for the treated plots than did the total precipitation during this period or the minimum temperature of the preceding winter.

New Hog-Cholera Vaccine Perfected

Crystal-violet vaccine for the prevention of hog cholera is announced by the Dept. of Agriculture as a promising addition to the series of products which the Bureau of Animal Industry has developed for control of destructive animal diseases. Like several of the preceding products, crystal-violet vaccine is the discovery of the late Dr. M. Dorset of the Bureau's Biochemic Division who died last July. Crystal violet is a chemical dye, one of many substances the biochemists have used in their efforts to destroy the infective elements and at the same time preserve the protective elements. Crystal violet does this better than any other substance tried. The element of cost has not yet been definitely determined and probably cannot be until the new product passes the experimental stage and is manufactured in quantity.

Fewer Fertilizer Formulas Suggested

Most farming areas which use large quantities of commercial fertilizer could be supplied by a dozen or so properly selected grades such as 4-8-4, 2-12-6 and others. Yet farmers as a whole must choose from more than a thousand grades when they buy fertilizer.

Almost 40% of the three and a quarter million tons of fertilizer sold in '34 was of 5 popular grades, 3-8-3, 3-8-5, 4-8-4, 2-12-6, and 4-8-7. Remainder, a little more than 60%, was divided among more than 900 grades, according to a joint survey by the Bureau of Chemistry and Soils and The National Fertilizer Association. This information, the investigators say, might well be used as a basis for reducing the number of grades.

Only 21 grades were sold in Mississippi—smallest number in any State using large quantities of fertilizer—as compared to 425 grades sold in Florida. In Mississippi 85% of the fertilizer was of one grade. In Florida, total sales for each of more than 200 grades were 25 tons or less.

"In most States fertilizer manufacturers are compelled by competition and other circumstances to make and stock many grades," says Dr. W. W. Skinner, Assistant Chief of the Bureau. "Fertilizer bags and tags have to be printed, chemical analyses made, and storage space provided for each grade. The cost of these items is about the same whether 5 or 5,000 tons are sold."

"Farmers can help eliminate many unnecessary grades by finding out the few well-selected grades that will serve their needs. This would help the local fertilizer manufacturer to produce tonnage instead of grades and sell his products for less money."

Results of the joint survey are summarized in a report, Plant Food Consumption in the United States in 1934. Copies may be obtained as long as the supply lasts from the Bureau of Chemistry and Soils, Washington, D. C.

Law on Labeling Animal Fly Sprays Revised

The Food and Drug Administration of the Dept. of Agriculture, Washington, D. C., issues revised instructions on labeling fly sprays for animals. Manufacturers of such products must comply with these regulations if the products are shipped in interstate commerce, and should not fail to apply for a copy.

Miscellaneous Notes

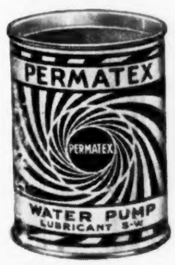
The weed, "devil's shoestring," contains rotenone, an insect-killing poison. Georgia, Texas, and Florida plants have the highest toxic content, according to the American Chemical Society.

Sum of 100,000 pesos has been authorized by the Chilean Dept. of Agriculture for pest and insect control in the Department of Quilotta which lies in the central zone of the country.

The Bulgarian Government is promoting the cultivation of pyrethrum. Plans call for commercial sale next year.

Automotive Specialties

Permatex Co., Sheepshead Bay, N. Y., long established manufacturer of automotive chemical specialties, has added 8 lubricants of special formulae to meet specific requirements in modern types of high speed motor vehicles.



Well-known Permatex label.

These Permatex Specialized Lubricants are Gear Oils, Extreme Pressure Lubricants, Gear Compound S-W, Chassis Lubricant S-W, Universal Joint Lubricant S-W, Wheel Bearing Lubricant S-W, Water Pump Lubricant S-W and Cup Lubricant S-W.

All of these products are marketed in 25-lb. pails; 100-lb., 200-lb. and 400-lb. drums. Last 5 named products are also marketed in one lb. lithographed cans under the standard Permatex trademark.

Much research has been devoted to the development of these special lubricants during the last few years and they represent the highest type of products that the efficient laboratories of the Permatex organization are capable of producing.

Packaging, Handling and Shipping

Chemical Specialty Packages Win Prizes in Retail Dry Goods Association "Private Label" Packaging Contest

Packaging played an important part in the deliberations of the National Retail Dry Goods Association meeting at the Pennsylvania last month. For the 1st time in the history of the organization a packaging display was shown, featuring "store-developed packages."

Winner of the special Retail Wolf Award was Abraham & Straus, Brooklyn department store, with its soap flake box (see cover, Chemical Specialties Section). In the classification, "Recognition for the best redesigned package," Sears, Roebuck's new gallon container for wood turpentine was the winner (see opposite page). The same company entered its Creme Polish, for furniture, and its Self Polishing Wax in the classification, "For the package of greatest attractiveness in more than one color."

Discussing packaging and private brands, M. J. Greenebaum, vice president of Felix Lilienthal & Co., N. Y. City, stated:

"Retailers today are giving more and more attention to the promotion of private brands. What can the smaller store do? Join with a group of other and uncompeting stores to purchase the most desirable goods for packaging and branding at prices that will give a satisfactory margin and also give the customer at least as much for his money as the nationally advertised brands give. Also there is the problem of choosing the proper resources and having the right connections to insure a uniform product and a sufficient line of branded goods enable the promotion to be continuous as it must be in order to be successful."

Similar views were advanced by Irwin D. Wolf, vice president of the Kaufmann Department Stores in Pittsburgh, when he said: "A store under its own brand can sell a 10 to 20% better article at the same price as the national brand, or the same quality as the national brand at a 10 to 20% lower price, or make a 10 to 20% better profit."

Egmont Arens, package designer, criticized the uniformity of packaging and asserted that even in automobile design the latest models with few exceptions were "as like as peas in a pod."

M. C. Pollock, production manager of Du Pont Cellophane, described the package as "an aid to impulse sales." He disclosed that a recent survey of "impulse purchasing" in department stores had shown 62.3% of the customers bought something they had not planned to buy and that of the total purchases 42.17% were made on impulse.

"We can't afford not to get these 'impulse' purchases," Mr. Pollock declared. "They constitute too big an item. Pile displays contribute largely to such purchases, yet packaging seems to be the most neglected form of display."

Ann Swainson of Montgomery Ward discussed better packaging with the aid of an exhibit that included old package cans for chemical specialties, drugs, etc., which she described as "just a mess" because every square inch was covered with reading matter. The exhibit included also some of the newer-type packages with very clear and simple identification marks.

Wolf Awards Competition Personnel Announced

Personnel of a distinguished Jury of Award for the Irwin D. Wolf Awards Competition in Packaging for '35-'36 is announced. Competition is open to all companies who have placed new or redesigned packages on the market during '35, and will close Monday, February 17. Awards are offered annually for outstanding accomplishment in merchandising and technical phases of packaging.

Members of the Jury include: Gordon Aymar, Art Dept., Blackman Advertising, Inc.; Richard F. Bach, director of industrial relations, Metropolitan Museum of Art; Edith M. Barber, writer and consultant on home economics; James C. Boudreau, Art Dept., Pratt Institute; Berent Friele, president, American Coffee Corp.; Alice Hughes, feature writer, *N. Y. American*; Ray M. Schmitz, associate merchandising manager, General Foods Corp.; Jack Straus, vice-president, R. H. Macy; and William Weintraub, *Esquire*.

DuPrene Now Used as Seal for Plastic Caps

DuPrene is being exploited for use as a seal for plastic caps on bottles containing acids or oils. Experiments have shown that DuPrene does not readily deteriorate when exposed to oils and acids, and its resilient characteristics make it an ideal material for this use.

A special type of construction for cap sealing material is being experimented with in the du Pont Co.'s laboratories. This product has as a background spruce fiber, similar to that used in making paper, and a DuPrene facing. Experiments conducted by bottle and cap manufacturers show that cork can be successfully bound with DuPrene, replacing casein as a binder. Casein has a tendency to dissolve, whereas DuPrene retains the homogeneity of the material. This type of material may be used as a bottle stopper as well as a cap seal.

Container Companies Advance Executives

Wilson & Bennett Manufacturing, Chicago, manufacturer of steel pails, drums and barrels, advances Harry F. Lepan to the position of general sales manager, and Ira Flatt to general factory manager.

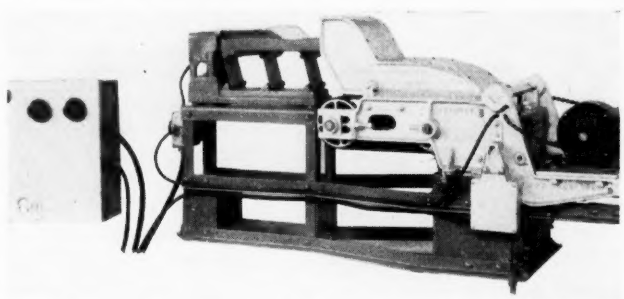
National Can appoints Louis M. Blickman assistant local sales manager in the Metropolitan area of N. Y.

National Can has just made Robert S. Solinsky an assistant V.-P. He is well-known through his 25-year connection with Continental.

Container Corp. of America acquires controlling interest in Sefton National Fibre Can Co. and changes name to Sefton Fibre Can Co.

New Electric Glue Heater and Mixer Marketed

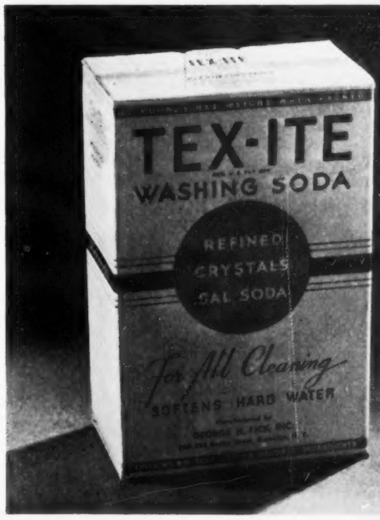
An improved type of electric glue heater and mixer, Type S, has been announced recently by Chas. E. Francis Co., Rushville, Ind. New heater is claimed to embody every desirable feature and modern improvement.



Above photograph shows the new Jeffrey Manufacturing "Constant Weight Feeder," for continuously feeding and weighing materials at accurate rates. Unit is accurate to plus or minus 1% or less.

New Products—New Packages

Above, C. M. Kimball Co., Everett, Mass., is now packing its Red Cap silver cleaner in a container suitable for cigarettes. Right, special bottles developed for the furniture polish just placed on the market by Gulf Refining. Below, Tex-Ite Washing Soda (George H. Fick, Inc., Brooklyn) is now being offered in a new attractive package designed and produced by Robert Gair. Left, the new Union Oil spot remover, "Stop Spot," described as a real achievement of the package designer's art.



The winner for the best redesigned package, before and after, was Sears, Roebuck's Seroco turpentine at the recent packaging exhibit held in conjunction with the meeting of the National Retail Dry Goods Association. Other chemical specialties shown were Seroco Wax and Maid of Honor Creme Polish. Abraham & Straus' Soap Flakes package won the Wolf Award for the best package put out under private brand labels. (See Chemical Specialties Section cover.)

Black Flag, Baltimore, is introducing two new products, Frey's Flea Powder and Frey's Vermifuge, in cleverly designed containers.

New Trade Marks of the Month

325,329

352,564
SUPREME

363,080
BACKER BRAND

364,395
LITHO BRADE

365,822
SWP
COVER THE EARTH

366,567
"CLEAN COILS MEAN PURE BEER"
ECLIPSE COMPOUND
TRADE MARK

367,996
THERMEX

368,266
SERVICE QUALITY
MERCO

369,220
DUANE'S SUPERFATTED SULPHUR SOAP
DINET AND DELFOSSE

369,221
DUANE'S SUPERFATTED SOAP
DINET & DELFOSSE

369,339
OPALITE

369,449
ISOFLEX

369,849
DOUBLEQUICK

370,338
CLARCO

370,442
PRENTOX

370,527
RED BAND

370,568
ERTRON

370,581
Imperial

370,241
THE BADGE OF QUALITY

Trade Mark Descriptions†

325,329. S. C. Johnson & Son, Racine, Wis.; filed Mar. 21, '32; for wax used to coat and polish wood, metal, etc.; use since Jan. 21, '31.

352,564. Western Auto Supply Agency of Los Angeles, Los Angeles; filed June 11, '34; for radiator liquid solder; use since Mar. 3, '34.

363,080. C. Woodard Co., Wilson, N. C.; filed Mar. 27, '35; for line of chemical specialties; use since Sept. 1, '34.

364,395. Norton Co., Worcester, Mass.; filed Apr. 30, '35; for abrasive grain used in graining lithographic plates; use since Apr. 17, '35.

365,822. Sherwin-Williams, Cleveland; filed June 5, '35; for silicate, clays, and enamel frits; use since 1893.

366,567. Eliz. F. Kuskulis (Eclipse Machine & Compound Co.), Denver; filed June 24, '35; for cleansing compound used in beer coils; use since Aug. 15, '33.

367,996. Geo. W. Gardner (Thermex Co.), St. Louis; filed Aug. 5, '35; for compound repairing leaks in radiators of motors; use since Oct. 4, '34.

368,266. Merchants Chemical Co., N. Y. City; filed Aug. 13, '35; for cleansers, stain removers, etc.; use on various type products since May '29 to July '35.

369,220. Dinet & Delfosse, Chicago; filed Sept. 12, '35; for chemically treated soaps; use since Oct. 5, '34.

369,221. Dinet & Delfosse; filed Sept. 12, '35; for chemically treated soaps; use since Feb. 5, '15.

369,339. Corona Products, Inc, Rogers, Ark.; filed Sept. 16, '35; for amorphous silica drilling mud for use in oil or gas wells; use since Aug. 1, '30.

369,449. Kooperativa Forbundet Forening u. p. a., Stockholm, Sweden; filed Sept. 18, '35; for thermal insulating material; use since Jan. 3, '35.

369,849. Jewel Paint & Varnish Co., Chicago; filed Sept. 30, '35; for ready mixed paints, paint enamels, and varnishes; use since Jan. 2, '35.

370,338. Francis G. Clark (Clark Products Co.), Lompoc, Cal.; filed Oct. 14, '35; for household cleansing and polishing powder; use since Apr. 1, '35.

370,442. R. J. Prentiss & Co., N. Y. City; filed Oct. 15, '35; for various type insecticide concentrates; use since June 1, '35.

370,527. Robert P. Scherer (Gelatin Products Co.), Detroit; filed Oct. 18, '35; for carbon disulfide in capsule form; use since Aug. '35.

370,568. Nutrition Research Labs, Chicago; filed Oct. 19, '35; for Vitamin D concentrate; use since Oct. 16, '35.

370,581. Ruberoid Co., Boundbrook, N. J., and N. Y. City; filed Oct. 19, '35; for asbestos pipe covering; use since 1895.

370,241. Nitrate Agencies Co., N. Y. City; filed Oct. 10, '35; for fertilizers; use since July 1, '33.

*Chemical Specialty Patents**

Production of adhesive by hydrolyzing starch and controlling viscosity during hydrolysis by the addition of borax and soda. Cool and dilute with water, add alkaline latex coagulating control agent and latex solution. No. 2,025,180. Frank H. Shoals, Baltimore, Md., to Modern Panels, Inc., a corp. of Del.

Production of a flexible abrasive implement in which a binder consisting of a drying oil type varnish is used. No. 2,025,249. Ralph C. Shuey, Downers Grove, Ill., to Bakelite Corp., N. Y. City.

Plastic composition comprising a mixture of ground oats, a fibrous filler, water, a substance which will set upon application of water, such as litharge or a bichromate, and a water-proofing substance. No. 2,025,369. Michael J. Batelja, Portland, Ore.

Process making building materials acid- and alkali-proof by applying a solution consisting on anilin hydrochloride, and another consisting of copper chloride, glacial acetic, and potassium chlorate. Finish with solution of potassium bichromate and sulfuric. No. 2,025,424. Karl Schultz to Gibb-Lewis Co., both of Chicago.

Shoe filler composition, spreadable and plastic at room temperature, comprising an aqueous dispersion of rubber containing rosin mixed with granulated cork, the particles of which are coated with waterproofing material. No. 2,025,-432. Harry H. Beckwith, Brookline, Mass., to Beckwith Mfg. Co., Boston, Mass.

Impregnating material for liquid-proofing gaskets comprising reduced-to-gum fatty acid metallic salt dissolved in suitable solvent. No. 2,025,486. Benjamin J. Victor, Oak Park, Ill., to Victor Mfg. & Gasket Co., Chicago.

Printing plate for polychromatic reproduction comprising an alcohol soluble base, fatty body, naphthaline, and a pigment. No. 2,025,559. Serge Tehechonin, Paris, France.

Production pleated sheet article containing an organic derivative of cellulose, and being extensible without loss of pleated form. No. 2,025,568. Joseph H. Brown, Brooklyn, N. Y., to Celluloid Corp., a corp. of N. J.

Production light sensitive layers by mixing sensitive ferric complex salt with an organic unsaturated acid of the aliphatic or heterocyclic groups. No. 2,025,675. Oskar Sus to Kalle & Co. Aktiengesellschaft, both of Wiesbaden-Biebrich, Germany.

Production oil proofing composiiton consisting of aggregate of glycyrrhizic acid salts and salts of homologous acids derived from extract of glycyrrhiza mixed with an albuminoid. No. 2,025,729. James K. Delano, Yonkers, N. Y.

Coating composition for grease-proofing paper made by forming an alkaline water solution of casein, another water solution of formaldehyde, mixing solutions, and adding the mixed solution to a rubber-latex emulsion. No. 2,025,788. Joseph H. Swan, 3d, to The Gardner-Richardson Co., both of Middletown, Ohio.

Coating of cellulose plastic material which is permeable to water vapor and suitable as tobacco pipe coating. No. 2,025,811. Micheal A. Dorian, N. Y. City, and Leo Roon, South Orange, N. J., to Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

Production stable fire-resisting hydrocarbonaceous material comprising chlorinated diphenyl mixed with normally non-fluid hydrocarbonaceous material. No. 2,025,929. James Howard Young to H. H. Robertson Co., both of Pittsburgh, Pa.

Production brake linings and similar friction material by mixing dry, fluffy asbestos, a potentially reactive synthetic resin, and a plasticizer. No. 2,025,951. Joseph Nestor Kuzmick to The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., both of Passaic, N. J.

Production free-flowing road treating material containing partially dehydrated calcium chloride. No. 2,026,121. William R. Collings to The Dow Chemical Co., both of Midland, Mich.

Production of artificial sponges from viscose. No. 2,026,177. Walter Johannes, Wolfen Kreis Bitterfeld, Germany, to Winthrop Chemical Co., Inc., N. Y. City.

Preparation of bituminous macadam by mixing clean stone containing limestone, an aqueous dispersion of bitumen, and mixing till stone is entirely coated with bitumen. No. 2,026,198.

Specialty patents continued on next page.

* Patents covered in this issue include those appearing in the *U. S. Patent Gazettes*, Dec. 24 to Jan. 21.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, Dec. 31 to Jan. 21.

Specialty Patents (Continued)

Augustus George Terrey, London, England, to The Flintkote Co., N. Y. City.

Method converting soft leather into relatively rigid leather by impregnating with hot solution of paraffine, colophony, Burgundy pitch, and neat's foot oil. No. 2,026,453. Arthur J. Beford, Littlestown, Pa.

Metal cement having following composition: lacquer 1¾ lbs.; iron filings 5 lbs.; whiting 1½ lbs.; hydraulic cement ¾ lbs.; and aluminum powder ⅛ lbs. No. 2,026,475. Nelson W. Larmore to Clifford N. Frederick, both of Waterford, N. Y.

Egg product consisting of egg material and a fairly high molecular weight fatty acid ester of a polyglycerol. No. 2,026,631. Benjamin R. Harris and Marvin C. Reynolds, Chicago.

Production flexible composition friction element consisting of 18 parts vegetable drying oil, 2.7 parts sulfur, 25 parts fine pyrobituminous material, and 65 parts short fibre asbestos, mixture being formed into shapes and cured by heat. No. 2,026,767. John D. Alley, Pittsburgh, Pa., to American Brakeblok Corp., N. Y. City.

Production hard water soap comprising combination of water soluble soap and a water soluble salt of an acid sulfuric acid ester of a higher aliphatic alcohol. No. 2,026,816. Heinrich Bertsch, Chemnitz, Germany, to American Hyalsol Corp., Wilmington, Del.

Production colored plastic magnesia article by adding magnesium chloride and other ingredients of a metal salt to the plastic magnesia. Color is determined by reaction to give colored hydroxide or oxide of the metal. No. 2,027,021. Albert Exton Cleghorn, Brooklyn, N. Y., to Travatex Products Corp., N. Y. City.

Wood filling composition comprising an aqueous vehicle, finely divided mineral filler, cellulose acetate, rubber latex, a drying oil, and crystallizing sodium salicylate. No. 2,027,-095. Earl D. Flood and John A. Hannum, Cleveland Heights, Ohio, to The Flood Co., Cleveland, Ohio.

Low free rosin sizing produced by dissolving alkali metal compound and rosin mix and subjecting solution to drying heat. No. 2,027,-166. William H. Harding, Flushing, N. Y., and Albert W. Montgomery, Cedartown, Ga., to American Cyanamid & Chemical Corp., N. Y. City.

Fluid sealing and packing composition comprising fibrous base impregnated with mixture of hydrogenated castor oil, and a solid lubricant. No. 2,027,389. Wilbur Arthur Lazier to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Container of fibrous material which is rendered oil- and water-proof by coating with a substantially hydrogen-saturated ester of a hydroxyl-containing fatty acid. No. 2,027,390. Wilbur A. Lazier, Marshallton, and James H. Werntz, Wilmington, Del., to E. I. du Pont de Nemours and Co., Wilmington, Del.

Adhesive material comprising a fairly dry coating of polymerized vinyl ester resin which acquires tackiness by addition of moistening liquid of resin solvent and an aliphatic hydrocarbon solvent. No. 2,027,435. Ernest L. Kallander and Gardner R. Alden to Dennison Mfg. Co., all of Framingham, Mass.

Cleaning and polishing composition comprising supporting paste vehicle and finely divided crystalline anthraquinone. No. 2,027,535. Bernard H. Jacobsen, Charleston, W. Va., to Klipstein Chemical Processes, Inc., N. Y. City.

Production of soap from sperm oil by saponifying oil and oxidizing alcohols with concentrated alkali. No. 2,027,936. Walther Schrauth, Berlin-Dahlem, Germany, to "Unichem" Chemikalien Handels, A.-G., Zurich, Switzerland.

Method of removing emulsion-forming impurities from used sealing or packing liquids of waterless gasholders by using a mixture of soap and water glass. No. 2,027,965. Hans Dellmann, Mainz, Germany, to Maschinenfabrik Augsburg-Nuernberg A. G., Nuernberg, Germany.

Insecticidal spray which leaves easily removable spray residues. Ingredient included is an aqueous inert insoluble material which reacts with acid wash solutions to form gas. No. 2,028,109. Irwin Stone, N. Y. City.

Laminated phonograph record consisting of a fibrous core impregnated with hardened artificial resin and coated with playing surface of vinyl resin composition. No. 2,028,126. Richard F. Warren, Stratford, Conn., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Dry white shoe polish comprising lithopone, or barium sulfate and zinc sulfide, mixed with talc and trisodium phosphate. No. 2,028,324. Hugh P. Griffin and Robert P. Richardson, Reidsville, N. C.

Impregnating material for cigarette wrappers consisting of soluble silicate containing fixed alkali base and fixed alkali nitrate. No. 2,028,-552. Albert H. Low; one-fourth to Carle Whitehead and Albert L. Vogl, all of Denver, Colo.

Powder for finger-printing comprising hydroquinone and acacia, used with a sensitive sheet wetted with sodium hydroxide and sodium sulfite. No. 2,028,619. Justin J. McCarthy, Boston, Mass.

370,582
Watcocell

370,583
Super Cell

370,704
ALSIBRONZ

370,748
CELATINT

370,750
PRINTACEL

370,793
Tabanol

370,794
Efali

370,795
Mogena

370,796
Reonal

370,842
ROSESTONE

370,896
THE END OF THE ROAD

370,910
Drisdol

370,928
LABORLITE

370,941
MAWAH

370,968
Insto-Kleen

371,028
BEACON

371,049
Orfon

371,050
Autowa

371,060
IO-DOW

371,093
F M C

371,103
BLACK J

371,237
CORTINA

371,238
Marquita

371,247

371,430
SWAGGER

Descriptions

370,582. Ruberoid Co.; filed Oct. 19, '35; for asbestos pipe covering; use since '26.

370,583. Ruberoid Co.; filed Oct. 19, '35; for asbestos pipe covering; use since '34.

370,704. Franklin Mineral Products Co., Franklin, N. C.; filed Oct. 23, '35; for micaceous powders used in paints pigments, as fillers, etc.; use since Sept. '33.

370,748. American Aniline Products, N. Y. City; filed Oct. 24, '35; for dyestuffs used on acetate and other artificial silks; use since Oct. 4, '35.

370,750. American Aniline Products, N. Y. City; filed Oct. 24, '35; for dyestuffs; use since Oct. 4, '35.

370,793. Bohme Fettchemie-Gesellschaft m. b. H., Chemnitz, Germany; filed Oct. 25, '35; for chemical dye aids; use since Aug. 16, '35.

370,794. Bohme Fettchemie-Gesellschaft m. b. H.; filed Oct. 25, '35; for chemical dye aids; use since Aug. 16, '35.

370,795. Bohme Fettchemie-Gesellschaft m. b. H.; filed Oct. 25, '35; for chemical dye aids; use since Aug. 16, '35.

370,796. Bohme Fettchemie-Gesellschaft m. b. H.; filed Oct. 25, '35; for chemical dye aids; use since Aug. 16, '35.

370,842. Shell Chemical Co., San Francisco; filed Oct. 26, '35; for chemicals used to treat irrigation water; use since Oct. 14, '35.

370,896. Goldwyn Smith (Smith Chemical Co.), Tampa, Fla.; filed Oct. 28, '35; for insecticides; use since Jan. 5, '35.

370,910. Winthrop Chemical Co., N. Y. City; filed Oct. 28, '35; for Vitamin D preparation; use since Oct. 15, '35.

370,928. Charles Beahm (Laborlite Co.), Portland, Oreg.; filed Oct. 28, '35; for cleanser having incidental soap saving and water softening properties; use since Aug. 29, '29.

370,941. Eric Coupey, N. Y. City; filed Oct. 29, '35; for natural and synthetic oils used in perfuming; use since Mar. '27.

370,968. Seal-Tite Products Co., Los Angeles; filed Oct. 29, '35; for preparation removing wax and grease from floors, woodwork, enamel, etc.; use since Oct. 5, '35.

371,028. Globe Roofing Products Co., Chicago; filed Oct. 31, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,049. Bohme Fettchemie-Gesellschaft m. b. H., Chemnitz, Germany; filed Nov. 1, '35; for chemical dye aids; use since May 23, '35.

371,050. Bohme Fettchemie-Gesellschaft m. b. H.; filed Nov. 1, '35; for chemical dye aids; use since May 23, '35.

371,060. Io-Dow Chemical Co., Long Beach, Cal.; filed Nov. 1, '35; for iodine, potassium iodide, and other iodine compounds; use since Oct. '34.

371,093. Federated Metals Corp., N Y. City; filed Nov. 2, '35; for nonferrous metals and alloys; use since July 1, '24.

371,103. Milton G. Jorgenson (Jorgenson & Co.), Los Angeles; filed Nov. 2, '35; for insecticides and fungicides; use since Apr. 15, '32.

371,237. Spanish Trading Corp., N. Y. City filed Nov. 5, '35; for castile soap; use since Sept. 1, '30.

371,238. Spanish Trading Corp.; filed Nov. 5, '35; for castile soap; use since Sept. 1, '30.

Continued on next page.

363,866

NEALCO

365,867

365,868

368,964

1832
FLOATING LAUNDRY SOAP
THE M.WERK CO.
ESTABLISHED 1832

369,680

COPALIT

369,923

WEATHERLOK

369,940

NATIONAL STEEL & COPPER PLATE COMPANY

369,942

NATSCO

370,827

POLYM

371,057

KLOR-LENE

371,079

NUFIN

371,299

TERGITOL

371,308

Latekoll

371,130

MONART

371,333

THQ

371,372

KALVAN

371,401

KATHENE

371,446

VICTOR Sohm's

371,472

ROKFLOS

371,729

CRAIG-MARTIN

371,486

chip-ee

Descriptions

371,247. Grand Rapids Plaster Co., Grand Rapids, Mich.; filed Nov. 4, '35; for plaster and lime; use since Sept. 9, '35.
371,430. Franklin Research Co., Philadelphia; filed Nov. 11, '35; for shoe wax, leather preservative and polish; use since June 24, '35
363,886. New England Alcohol Co., Everett, Mass.; filed Apr. 17, '35; for denatured alcohol as anti-freeze; use since Sept 18, '34.
365,867. Standard Brands Inc., N. Y. City; filed June 6, '35; for phosphate-lactate mixture used as baking powder with sodium bicarbonate; use since July '34.
365,868. Standard Brands Inc.; filed June 6, '35; for phosphate-lactate mixture used as baking powder with sodium bicarbonate; use since July '34.
368,964. The M. Werk Co., St. Bernard, Ohio; filed Sept. 3, '35; for soap; use since Nov. 11, '32.
369,680. Aktiengesellschaft Johannes Jeserich, Berlin-Charlottenburg, Germany; filed Sept. 25, '35; for phenol-aldehyde artificial resins; use since May 1, '30.
369,923. Johns-Manville, N. Y. City; filed Oct. 2, '35; for composition shingles and roofings; use since Aug. 2, '35.
369,940. National Steel & Copper Plate Co., Chicago; filed Sept. 25, '35; for line of chemical products; use since Apr. 1, '05.
369,942. National Steel & Copper Plate Co.; filed Sept. 25, '35; for substitute for potassium iodide and resublimed iodine; use since Apr. 1, '05.
370,827. Ellis-Foster Co., Montclair, N. J.; filed Oct. 26, '35; for phenol-aldehyde synthetic resins; use since July 31, '35.
371,057. The Davies-Young Soap Co., Dayton, Ohio; filed Nov. 1, '35; for liquid spotting solution used in dry cleaning; use since July 15, '35.
371,079. Roy Elwood Roth (Roth & White), Lancaster, Pa.; filed Nov. 1, '35; for furniture and automobile polish; use since Sept. 30, '35.
371,299. Carbide & Carbon Chemicals, N. Y. City; filed Nov. 7, '35; for textile agents; use since Dec. 18, '34.
371,308. I. G., Frankfort-am-Main, Germany; filed Nov. 7, '35; for latex-thickening agents; use since Sept. 10, '35.
371,130. Atlantic Calsomine Co., Brooklyn; filed Nov. 4, '35; for cold and hot water calsomine; use since Oct. 18, '33.
371,333. W. H. & L. D. Betz, Philadelphia; filed Nov. 8, '35; for tetrahydroxyquinone indicator; use since Apr. '34.
371,372. R. T. Vanderbilt Co., N. Y. City; filed Nov. 8, '35; for processed calcium carbonate; use since Oct. 26, '35.
371,401. Surface Combustion Corp., Toledo, Ohio; filed Nov. 9, '35; for air conditioning fluids; use since Oct. 29, '35.
371,446. Otto Eugen Schniebs (Otto Eugen Schniebs Co.), Hanover, N. H.; filed Nov. 11, '35; for wax used on skis, shoes, etc.; use since May 15, '35.
371,472. Owens-Illinois Glass, Toledo; filed Nov. 12, '35; for heat and sound insulating building material; use since Dec. '31.

Continued on next page.

White, Philadelphia Controller

Dr. Robert C. White, Robert C. White Co., is named Controller by Mayor Wilson. In the recent election Dr. White headed a committee of 1,000 business men.

In New Locations

Chemical Service Corp., Baltimore, leases 4-story plant at 860 N. Howard st.

Public Exterminating, Chicago, moves from 828 N. Clark st. to 1325 S. Michigan Blvd.

Acme Sanitary Supply, Denver, moves from 1505 E. 13th ave. to 2819 Larimer st.

Deaths Last Month

Theodore L. Rudberg, 58, head of a St. Paul firm making shoe polishes, died on Jan. 10th.

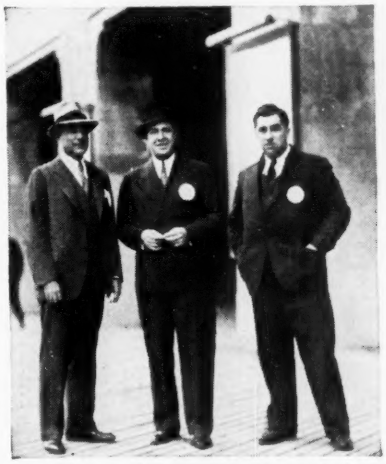
Joseph W. Overton, president, Trio Manufacturing, Bayonne, boiler compounds, died suddenly of a stroke, Jan. 18th.

"5 & 10" Package Contest

Syndicate Store Merchandiser annually sponsors a "5 & 10" packaging contest. Winner this year was Colgate-Palmolive-Peets' 10c line of Cashmere Bouquet. Three-in-One Oil was another well-known specialty entered. Du Pont and General Plastics showed low cost packaging materials.

Literature on Mineral Oil

S. Schwabacher & Co., 25 Beaver st., N. Y. City, has just released literature giving the approximate specifications of its Flag Brand W-100 white mineral oil which it recommends for use in cosmetics, textiles, sprays, polishes, processing of lamp shades and wrapping paper, and other miscellaneous uses. Copies are available.



AUTOMOTIVE CHEMIST, SALES MANAGER AND RACE DRIVER

C. A. Benoit, president, Permatex Co., and H. J. Enders, sales manager, snapped on the boardwalk at Atlantic City with Milt Marion, race driver, one of the official field testers of Permatex automotive chemicals.

364,904
DART'S

366,283
Nu-Wite

366,884
EVERGLADES

369,300
MEDUSA

369,301

369,302
MEDUSA-LITE

370,031
WHITE QUEEN

370,073
RITE-WAY

370,926
MISSION

371,270
CAN-O WOOD

371,493
Drionizing

371,495
C-Q

371,523
POLARIZED

371,524
TERGITOL

371,551
J-A-M

371,585
CASCOTINE

371,613
YEAR CLEAR

371,616
PETROLAC

371,628
EKC

371,694
KELTEX

371,826
LIQUID METALLATION

371,914
ELECTRIC ENERGY

372,044
COMPOCORK

372,110
Reward

Descriptions

371,729. Comfort Mfg. Co. (Craig-Martin), Chicago; filed Nov. 19, '35; for soaps and shaving creams; use since Nov. 5, '30.
371,486. Chic-ee Mfg. Co., Allentown, Pa.; filed Nov. 13, '35, for shoe polishes; use since Oct. 1, '35.
364,904. Walgreen Co. (J. W. Dart Paint & Varnish Works), Chicago; filed May 13, '35; for ready mixed paints and enamels; use since Apr. 18, '35.
366,283. La France Toledo Co., Toledo; filed June 17, '35; for water softener-deodorizer improving cleansing qualities of liquids; use since July '32.
366,884. South Florida Chemical Corp., Miami; filed July 1, '35; for insecticides; use since Apr. 4, '35.
369,300. Medusa Portland Cement Co., Cleveland; filed Sept. 14, '35; for dry, paste, and ready-mixed paints, and floor coatings; use since '20 on paints and Jan. '34 on floor coatings.
369,301. Medusa Portland Cement Co.; filed Sept. 14, '35; for dry, paste, and ready mixed paints, and floor coatings; use since '20 on paints and Jan. '34 on floor coatings.
369,302. Medusa Portland Cement Co.; filed Sept. 14, '35; for paint in paste form; use since Aug. 1, '35.
370,031. E. A. Meyer (Green Bay Soap Co.), Green Bay, Wis.; filed Oct. 4, '35; for soaps, household cleansers, and water softeners; use since 1898 on soap, '34 on powders and July 25, '35, on cleansers.
370,073. Cardinal Labs., Inc., Chicago; filed Oct. 7, '35; for insecticides and shoe dyes; use since Jan. '35 on insecticides and '24 on shoe dyes.
370,926. Muralo Co., New Brighton, N. Y.; filed Oct. 25, '35; for dry powder to be mixed with water for water tint solution; use since Nov. 15, '34.
371,270. Perfect Mfg. Co. (So-Lo Works), Cincinnati; filed Nov. 6, '35; for plastic repair material; use since Mar. 29, '35.
371,493. The Gregg Co., Philadelphia; filed Nov. 13, '35; for household and industrial cleaner; use since Oct. 28, '35.
371,495. Harry I. Hull, Queens Village, L. I., N. Y.; filed Nov. 13, '35; for hand cleansers, soaps, etc.; use since July 18, '34.
371,523. Camel Lead Color & Chemical Products Mfg. Corp., Brooklyn; filed Nov. 14, '35; for ready-mixed paint, paint enamel, and wall paint; use since Aug. 19, '35.
371,524. Carbide & Carbon Chemicals, N. Y. City; filed Nov. 14, '35; for cleaning compositions in textile, tanning, and cosmetic industries; use since Dec. 18, '34.
371,551. John Albert Myers, Philadelphia; filed Nov. 14, '35; for insect powder; use since Nov. 2, '35.
371,585. Casein Mfg. Co. of America, N. Y. City; filed Nov. 15, '35; for glues; use since Aug. 15, '35.
371,613. Westoco Products, Kansas City, Mo.; filed Nov. 15, '35; for glass cleaning solutions; use since May 1, '35.
371,616. Advance Solvents & Chemical Corp., N. Y. City; filed Nov. 16, '35; for synthetic resins used in protective coatings and molded products; use since Dec. 24, '30.
371,628. Eastman Kodak, Rochester; filed Nov. 16, '35; for paste; use since '25.
371,694. Kelco Co., San Diego, Cal.; filed Nov. 18, '35; for alginate to be used as a colloid in the textile trade; use since Oct. 4, '35.
371,826. Reynolds Corp., N. Y. City; filed Nov. 21, '35; for aluminum paint; use since Mar. 1, '35.
371,914. Electric Energy Co., Oakland, Cal.; filed Nov. 23, '35; for crystals used in storage battery electrolytes; use since July 1, '35.
372,044. Carthage Mills Inc., Cincinnati; filed Nov. 27, '35; for felt base floor covering coated with linoleum composition containing cork; use since Sept. '35.
372,110. Lever Bros.; filed Nov. 29, '35; for detergent compound; use since Nov. 23, '35.

F. T. C. Wars on Fabric Cleaners

Federal Trade Commission is carrying on its sudden fight against fabric cleaner manufacturers.

According to F. T. C. stipulation, Monroe Chemical, Quincy, Ill., will discontinue use of certain words or phrases tending to deceive buyers into believing that the colors of fabrics dyed with non-fast or fugitive dyes will not be harmed by application of respondent's product, or that product will not leave stain, mark or ring when applied to spots on certain fabrics or materials.

Cleaning fluid, "Zep", will no longer be advertised as "non-injurious" to fabrics in connection with its sale as a cleaner, nor will the phrase "Will not form rings," be used in connection with its sale, according to stipulation signed by Harry Kantrowitz, Aaron Gershon, and Benjamin Schreiber, copartners, of N. Y. City, trading as Gershon & Schreiber.

Use of phrases, "Removes spots without injury to color or fabric," and "Will not leave a ring," will be discontinued by Klink Products Corp., Brooklyn, N. Y., manufacturer of 2 cleaning fluids, known as "Klink" and "Clean-Tex." Stipulation says use of the product on certain fabrics does result in appearance of a mark or ring, and that certain fabrics are injured by use of the fluid thereon.

Fels Naptha's new baby (described in the January issue), subject of heavy 1936 advertising.

CHEMICAL

NEWS & MARKETS

THOMAS S. GRASSELLI

Resigns presidency Grasselli to become vice-president and member executive committee, du Pont

HULL TRADES LARD FOR DYES

Switzerland Pact Sacrifices Dye Industry, Defended by Every President from Wilson to Hoover—Producers Fear Influx of German Dyes—

Dyes for lard. In a sentence this describes the latest Hull reciprocal trade agreement signed with Switzerland. American chemical producers, aroused out of their complacency last month when the terms of the Netherlands pact were announced, are now thoroughly alarmed over future policies of the Administration. They were totally unprepared for the sweeping concessions made to Swiss dyes. Many chemical executives are pessimistic over the outcome of both the pacts already in effect and those still contemplated by Secretary Hull. Many feel that there is little use of "locking the stable door now that the horse has escaped." Influential leaders feel, however, that a crisis has been precipitated by the action of the State Dept. and are ready to demonstrate that the policy of lowering import rates on chemicals is a fatal move to the welfare and defense of the country and contrary to the stated policies of every president from Wilson to Hoover.

Latest concession applies to coal-tar colors, dyes, and stains described in paragraph 28a of the tariff act of '30. Imports of these dyes from Switzerland in '34 were valued at $2,521,000, and the duty reduction is estimated by the State Dept. as averaging between 22% and 24%.

Under the '30 act these dyes are dutiable at 7c per lb. plus 45% *ad valorem* on the American selling price if competitive and on the U. S. value if noncompetitive. Swiss agreement eliminates the specific duty and reduces the *ad valorem* to 40%, to be calculated on the same basis as at present, but because of the stipulation in the law authorizing negotiation of trade agreements, there is a provision that the minimum duty on Swiss dyestuffs shall be half the '30 rate or 3½% per lb. plus 22.5%.

U. S. duties on 10 other types of Swiss chemicals are either reduced by one-third or one-half or bound against increased duties during the life of the agreement. These are chloroacetic acid, barbiturates, compounds of gluconic acid, digitalis glucosides, ergotamine, tartrate, pigments of lead suboxide, and four perfume materials—heliotropin, geraniol, hydroxycitronellal, and artificial musk.

Agreement provides for unconditional most-favored-nation treatment by both countries, but the State Dept. points out that Germany, chief competitor of Switzerland in dye exports, has renounced her most-favored-nation agreement with the U. S. and will not receive the benefit of these duty reductions.

Despite this explanation, domestic dye producers and others point out that the European dye cartel is perhaps the most effective organization of its type and that because of its wide ramifications German producers will at least indirectly obtain substantial benefits from the provisions of the new Swiss pact as well as the important Swiss dye manufacturers.

In addition to the concession on lard, Switzerland binds herself to a low rate on crude coal-tar derivatives and agrees to larger imports of petroleum products from the U. S.

In connection with the announcement of the details of the new pact the State Dept. issued a lengthy statement which is reproduced in part:

"Agreement provides that such dyes shall be subject to an *ad valorem* duty of 40%, applied on the same bases as heretofore, the specific rate being eliminated. On low-priced dyes the American dye industry meets world prices in export markets and the change of duty is not onerous. On the high-priced dyes, which sustain the research work of the chemical industry, the change of rate is comparatively unimportant in magnitude. On the medium-priced dyes the reduction, which averages about 23%, is significant and will probably stimulate imports. By virtue of the valuation of competitive imports at American selling price the domestic dye industry will retain a high level of tariff protection.

"Imports of coal-tar dyes amount to about 5% of the weight and 20% of the value of dye consumption in the U. S. Prior to '34 Germany was the principal source of imports; in '34 Switzerland supplied about half the imports by value, and in '35 more than half. Inasmuch as Germany has cancelled her most-favored-nation provision with the U. S., that country does not obtain benefit from this or any other concession in the agreement with Switzerland. Operations of the German-owned dye plant in Switzerland are not sufficient in scope to divert any appreciable part of the benefits of this concession to German dye interests.

"Coal-tar colors, dyes, and stains constitute one of the important imports from Switzerland, amounting to more than two million dollars annually. The Swiss dye industry is primarily an export industry and is the originator of many of the new dyes which appear on the American market.

"This concession with reference to dyes is of great importance to the domestic textile, leather, paper, paint, and ink industries."

Statement also points out that the U. S. exports more chemicals to Switzerland than she receives from her.

T. S. Grasselli Elected du Pont V.-P.

E. W. Furst, Former Shipping Clerk, 1st Outside Grasselli Family To Head Company—Simpson, New Coopers Creek President — Cyanamid Engages Shepard — Others In New Positions—

Thomas S. Grasselli, president of Grasselli Chemical, is now a vice-president of du Pont and a member of its important executive committee. Mr. Grasselli has been a director of du Pont since '29 when the organization of which he is president, became a wholly owned du Pont subsidiary.

Mr. Grasselli has devoted his entire business life to the chemical industry which he entered in 1893 immediately on his graduation from Mount St. Mary's College. He joined the old established Grasselli Chemical Co. in Cleveland which was founded by his grandfather in 1839 and of which his father, C. A. Grasselli, was then the president. The phrase, "learning the business from the ground up," applied markedly in the case of Mr. Grasselli who served in all departments and made rapid strides in the industry.

In '16 when his father retired and was made chairman of the Board, Mr. Grasselli was elected president. Under his leadership, the company faced the new and intricate problems of the war period. The trying post-war years found his organization in shape to meet the new problems and Grasselli went through these years maintaining its position as one of the country's leading and successful chemical organizations.

After the merger of Grasselli with du Pont in '29, Mr. Grasselli became a director of the latter company and continued as president of the Grasselli organization.

During the Spanish-American War, Mr. Grasselli served as captain of the 1st Ohio Volunteer Cavalry and was later attached to the Quartermaster's Dept. He has been active in the civic affairs of his native city of Cleveland.

Leadership of Grasselli Chemical has passed to a man bearing another name for the 1st time since the venerable Grasselli family supplied the needs of the medieval Italian alchemists.

E. W. Furst, executive vice-president of Grasselli, has been elected president succeeding Mr. Grasselli. Mr. Furst has been identified with Grasselli since 1893 and has been importantly connected with its progress in the chemical world. He

A. M. SIMPSON

DR. NORMAN A. SHEPARD

DR. W. M. LOFTON, JR.

Simpson is new Coopers Creek president; Shepard will do technical service for Cyanamid; Lofton heads Penn. Coal Products' research.

was a vice-president at the time of its consolidation with du Pont and was then made executive vice-president. He becomes also chairman of the board.

A. M. Simpson is the new president of Coopers Creek Chemical, succeeding C. C. Tutwiler who founded the company in '15. Other personnel changes include the appointment of M. C. Swope as superintendent of manufacture, and R. A. Nelson to the post of chief engineer. E. D. Dickie has been appointed sales manager. Mr. Dickie was formerly in charge of the company's Philadelphia district sales operations.

A refinery for the production of benzol, toluol, and xylol, as well as other solvent naphthas and high flash naphthas has been put into operation.

Dr. Norman A. Shepard has been appointed director of technical service for American Cyanamid, American Cyanamid & Chemical and other companies in the Cyanamid group where cooperation in this field is required. He will be responsible for directing the technical service laboratories located in Stamford, Conn., expansion of the sales services laboratories to meet present and increasing need and the co-ordination of the technical and sales service work in all of the several divisions of the above-named companies.

Dr. Shepard is a graduate of Yale (Ph.D. '13), was assistant professor of chemistry at Yale from '17 to '19 and has been director of the Firestone research laboratories from '19 to date. He will begin his work with the Cyanamid group on or about Feb. 15th and will have his headquarters at the Stamford Laboratory.

Dr. and Mrs. Shepard at present are guests of Harvey S. Firestone at the latter's place at Miami Beach.

Paul Mayfield, manager of Hercules' naval stores department, Chicago, for the past 2 years and a member of the company's Chicago staff since '31, is called to Wilmington, to assume duties as assistant director of sales in the naval stores department.

G. B. Hafer, with J. T. Baker Chemical over 10 years and manager of the Chicago office, returns to headquarters at Phillipsburg, N. J., in charge of sales of laboratory chemicals. F. D. Hildebrandt, southern representative, takes over Mr. Hafer's duties at Chicago.

Caesar A. Grasselli, new du Pont London manager, sailed in the *Europa*, Jan. 11th, for his new post. He was accompanied by Mrs. Grasselli and their daughter, Miss Josephine Grasselli. See rotogravure section, this issue.

Dr. H. B. Mann, agronomist in Soil Fertility, North Carolina State College of Agriculture, joins the American Potash Institute as assistant manager, southern territory, located in the Mortgage Guarantee Bldg., Atlanta. Dr. J. N. Harper is manager of southern territory.

A. J. Wadhams, manager of development and research, International Nickel, announces addition of Thomas N. Armstrong, Jr., to the technical staff. Mr. Armstrong, who will handle steel castings development for the company, will operate out of the N. Y. City office. His services will be available to industry at large.

A. F. de Ravignon, formerly with Frank Bownes Co., is now New England representative for Titanium Pigment.

Chemical Exports Up Eleven Million in 1935

Every Major Item Shows Gain But Sulfur—Specialty Sales Heavy—Germany Continues World's Largest Exporter—Jap Profits Jump—Other Foreign Notes —

Foreign demand for American chemicals continued strong in '35, gaining substantially over the preceding year, and on a value basis was almost 30% heavier than in '33. Moreover, export trend strengthened as the year advanced, reaching very high levels in the last half, particularly in October and November, with every major export item, except sulfur, sharing in the gain.

An encouraging feature, aside from the general increase, was the notable expansion of markets for high grade specialties, such as ready mixed paints, toilet requisites, household insecticides, liquefied gases for heating and refrigerating, and a host of other typically American products. A number of these specialty items were shipped to practically every country of the world.

Total value reached $136,677,000 in '35, or about 65% of the '29 value, and compares with $125,777,000 during the preceding year, and $106,731,000 in '33, preliminary statistics show.

Industrial chemicals, which include such products as alcohols, acids and sodium compounds, have made the best export showing in the chemical and related product field during the past 3 years. Exports of such products aggregated $23,627,300 in '35, compared with $21,683,500 in the preceding year, and $16,801,700 in '33. The 40% increase in this group over the '33 level was due very largely to heavier shipments of the miscellaneous small items included in the total, analysis shows.

Shipments of naval stores, gums and resins, the principal items of which are rosin and turpentine, aggregated $16,489,000 during the year, compared with $14,489,200 in '34. Shipments of both turpentine and rosin increased in value, despite intense competition in world markets from European naval stores producers.

Export demand for paints, pigments, and varnishes, was especially good during the year, grand total of such shipments reaching $16,345,000. In the preceding year export shipments of such products were valued at $14,214,000, and in '33 value was $11,834,000. In this group shipments of ready mixed paints, varnishes and lacquers have almost doubled, both in quantity and value, during the past 3 years.

Our rapidly growing export trade in fertilizers is noteworthy. Almost 1½ million tons of fertilizer materials, valued at $14,809,000 were exported in '35, compared with 1 and 1/3 million tons valued at $12,543,000 during the preceding year, and a little over one million tons valued at $8,269,000 in '33. Approximately one-half of the value of shipments in '35 was accounted for by potassic and nitrogenous fertilizers and fertilizer materials. Other items on the chemical export list recording increases over '34, included coal tar products, medicinals, soaps and toilet preparations, drugs and essential oils, and industrial explosives.

Germany continued the world's largest exporter of chemicals and allied products

during '35 and was able during the 1st 10 months of the year to increase the quantity of such shipments approximately 10% over the corresponding period of '34, according to an analysis made by the Commerce Dept.'s Chemical Division. Due to lower price levels, however, value received declined slightly to a total of $209,062,000, statistics show.

Among classes recording substantial increases in '35 were included indigo dyes, prepared medicines, certain of the industrial chemicals and fertilizers, practically all pigments, and oil paints. Shipments of aniline and alizarine dyes declined somewhat in quantity.

Analysis reveals that approximately 44% of Germany's exports of chemical and allied products during the '35 period consisted of dyes and prepared medicines.

Stringent import regulations enforced in Germany during '35 resulted in receipts of foreign chemicals and allied products declining 25% in quantity to 1,862,500 tons during the 1st 10 months of the year and the value decreased 19% to $69,-084,000 compared with the corresponding period of the preceding year.

Although losses were spread quite generally throughout the numerous classes comprising Germany's chemical import trade, most outstanding was in receipts of coal-tar crudes and intermediates, including pitch, which declined 60% in quantity and 48% in value compared with the '34 period. Other items registering appreciable declines included phosphate rock, basic slag, superphosphates, rosin and kauri gum.

A feature of German economy in '35 was the determined effort of chemists, aided and otherwise encouraged by the Government, to produce domestically by synthesis as many products as possible in order to limit imports and ease the acute exchange situation.

Chemical Notes From Abroad

Profits of 67 Japanese chemical and allied product manufacturers averaged 13.3% during the 1st half of '35 compared with 11% for 1,250 of the most important joint stock companies of the country which are engaged in all branches of commerce. Dye manufacturers showed the largest profit in the chemical group followed by companies producing acetic acid, sodas, pyroxylin plastics and fertilizers.

World potash production increased in '35 with practically all producing countries sharing in the gain. Deliveries of pure potash amounted to around 2,000,000 metric tons during the year, according to estimates, compared with 2,037,000 tons in '30, the record year, and 1,100,000 tons in '13.

Contrasted with improvement in most producing countries potash sales by French Alsatian mines declined, due to the severe crisis in French agriculture, and to the inability of fertilizer dealers to extend credit. With a view to improving the situation the industry has made substantial price reductions during the past 2 years.

World consumption of manufactured nitrogen also increased substantially in '34-'35, gaining 7.1% over the preceding period. Consumption for all purposes reached 2,031,000 metric tons during the year, according to estimates compared with 1,878,000 in '33-'34, and 1,951,000 tons for '29-'30. Consumption increase was due very largely to heavier demand for fertilizer in practically all important consuming countries, except France.

German linseed oil imports have been greatly reduced in recent months due to the shortage of foreign exchange, and as a result paint manufacturers have made increasing use of substitutes, including carbolineum, an oil made from coal-tar.

Japanese Nitrogen Sales Bureau and the European Nitrogen Syndicate are in agreement on Japanese imports and exports for '36. In the 1st 6 months Japan will be allowed to import 125,000 tons of nitrogen and this figure may be increased by 50,000 tons. In the last half Japan will be allowed to export 60,000 tons to the U. S. and to countries in the Far East. Sale of Japanese nitrate must not be lower than 97% of the price quoted by European producers.

Synthetic Rubber Uses Demonstrated

Industrialists "Grow" Rubber at Thiokol Luncheon—U. S. Independence of Foreign Crude Rubber Demonstrated—More Valuable Than Rubber For Many Purposes—

One hundred and fifty industrial executives, editors and chemists had the experience Jan. 27th of mixing chemicals and creating synthetic rubber on the linen of their own dining tables. Gathered at a luncheon in the Biltmore, N. Y. City, they pushed aside their dishes and silverware and under the direction of

Dr. Reid, Johns Hopkins, assists Dr. Patrick, Thiokol chief chemist, making synthetic rubber.

the inventor of the product, Dr. J. C. Patrick, chief chemist for the Thiokol Corp., tried their hands at amateur chemistry.

Individual mixing glasses, normally used for old-fashioned cocktails, and sticks were placed before each guest. Glasses contained chemicals (polysulfide and ethylene dichloride) to be mixed as with a mortar and pestle. Waiters placed corked test tubes with the dilute hydrochloric acid beside them and the production of rubber began.

Speakers included C. Emmett Reid, head of the Organic Chemistry Dept., Johns Hopkins, Dr. Patrick, Bevis Longstreth, president of the Thiokol Corp., Sidney Kirkpatrick, editor, *Chem. & Met.*, and Donald Simmons, chief of research, the General Cable Co.

Like Goodyear's discovery of vulcanizing, which made rubber, Dr. Patrick's discovery of Thiokol was an accident. Looking for an anti-freeze liquid, he poured 2 chemicals together and got, instead of the expected liquid, a gummy looking mass that looked and acted like rubber. And most important, it is unaffected by gasoline and oil, the enemies and destroyers of rubber. This occurrence was the real beginning of synthetic rubber in this country.

Today Thiokol is used in a thousand different ways. Only recently was one of its newer uses strikingly demonstrated. It is written into the Army Air Corps. specifications for fuel hose, because of its immunity to gasoline. The China Clipper on its remarkable flight had all its gas tanks sealed with Thiokol, which was sprayed on the inside of all containing walls.

In stating that the U. S. is in a position of independence insofar as rubber requirements in time of war are concerned, Mr. Longstreth showed the quantities of synthetic rubber that can be produced by his concern and by the du Pont Companies with their recently completed plant for the manufacture of DuPrene. An acre of rubber trees yields approximately 500 lbs. of rubber in 500 years. An acre of Thiokol—that is, the plant equipment to produce it—can turn out 200 tons in 5 hours. And the raw materials, sulfur, salt, and natural gas are practically inexhaustible.

Other important uses mentioned by various speakers were: the development of synthetic rubber powder which can be used for plastic molding purposes, eliminating the longer production time necessary for vulcanizing rubber; the wide application in automotive oil industry and filling station uses where gasoline and oil are important deterrents of rubber life; general specifications of synthetic rubber by the War and Navy Departments for use in airplane and lighter-than-air equipment; widespread possibili-

ties in the printing industry—Thiokol blankets for newspaper printing are widely used.

Several speakers pointed out that synthetic rubber for many uses has more desirable properties than the natural material; that as long as crude rubber sells for 10-15c per lb. that the synthetic would not be likely to take its place for rubber tires, yet, that research work was endeavoring to cheapen the cost of processing synthetic under the cost of milling the natural so that tire and other rubber manufacturers could afford to pay higher prices for synthetic rubber and still have a final manufacturing cost no higher than those they are confronted with now when using natural crude rubber.

Dow Wins in Oil Well Treating Suit

Aluminum Co. and Davison Settle Activated Alumina Case—National Carbon Sues U. S. I. Over Chaney Activated Carbon Patent—Other Litigation In January—

Dow Chemical announces that the Federal Court of Appeals in the 10th Circuit at Denver, Col., has rendered a decision, reversing the lower court, and upholding the validity of the Dow patents covering the Dowell method of treating oil wells with acid to increase production. The decision is regarded as of primary importance to the Dow company since the process is now in extensive use in oil fields. Suit was brought against the Williams Well Treating Corp. of Tulsa, Okla., who has been enjoined by the decision and ordered to make an accounting.

"Activated Alumina" and other aluminous adsorbents, the aluminum oxide adsorbents sold by the Aluminum Co., do not infringe U. S. patents No. 1,335,348, 1,537,260, and 1,678,298, granted to Silica Gel, when these adsorbents are used in the treatment or purification of gases, liquids, and oils, according to consent decrees.

Actions to determine this question were brought by the Aluminum Co. While the suits were in progress the patents were sold by Silica Gel Corporation to Davison Chemical, which intervened as a defendant.

Suits were settled when Silica Gel and the trustees of Davison Chemical consented to final decrees, holding that Aluminum Co.'s adsorptive aluminous products, of which "Activated Alumina" and "Aloroo Adsorbent" are typical, do not infringe the patents in question.

National Carbon has entered suit against U. S. I. in Baltimore alleging infringement of the Chaney activated carbon patents.

A settlement providing for the payment of royalties and damages to Catalin has been reached with Catalazuli Manufacturing, which has discontinued the manufacture of plastics infringing upon the Catalin patents. Settlement was reached out of court.

House of Representatives on Jan. 7 passed a resolution permitting Rodman Chemical to sue in the Court of Claims for compensation for use by the government of a patent for making activated carbon for gas-masks during the World War.

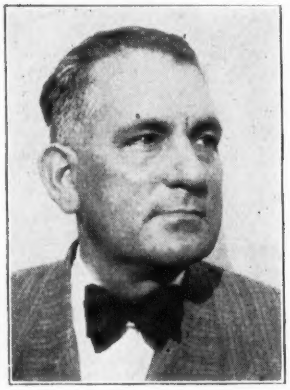
Bopf-Whittam Co., Westfield, N. J., making lanolin, wool greases, etc., files restraining complaint against M. P. Gotowski and Stanley J. Czech, operating as Genuine Chemical Co., Elizabeth, alleging illegal use of the Westfield firm's manufacturing secrets.

Gasoline Products has filed suit against Henry H. Cross Co., Chicago. Bill of complaint charges infringement of 3 cracking patents identified as follows: Black No. 1,456,419, Howard and Loomis No. 1,869,337 and Black No. 1,971,248. Suit, which has been given Equity No. 15,005, was filed Jan. 2nd, in the District Court of the U. S. for the Northern District of Illinois, Eastern Division.

Jardy Dies in Cuba

News of Death Just Received —January Obituaries—

News of the death of the well-known Cuban chemical importer, J. M. Jardy, on Sept. 6th, '35, has just reached this



country. The firm is now known as Vda. de J. M. Jardy, and offices are still maintained at Apartado 1772, Havana, Cuba.

Other Deaths of the Month

W. K. Alsop, U. S. Leather Co. chief chemist, and editor of the *Journal of American Leather Chemists Association* for many years, after a brief illness, in Corry, Pa., Jan. 5.

William D. Neill, 81, nationally known metallurgical engineer and first employee of the Solvay Process, in Syracuse, Jan. 6th. Ill health had forced Mr. Neill's retirement in '21.

Clyde L. Chamberlain, 44, Bakelite works manager at Bloomfield, N. J., on Jan. 14th.

Benjamin K. Hotchkiss, chief salesman for Hooker Electrochemical and member of the Chemists' Club, at his home, Short Hills, N. J., 18th.

William Lynn, 91, president of William Lynn Chemical, Indianapolis, 18th.

A. B. Shepherd, Jones & Laughlin v.-p., director, and member of the executive committee, suddenly, in Pittsburgh, 25th.

Warren Mathews Foote, 63, Foote Mineral president, of pneumonia, 28th.

COMING EVENTS

Technical Association of Pulp & Paper Industry, Annual Meeting, Waldorf-Astoria Hotel, N. Y. City, Feb. 17-20.

American Association of Mining & Metallurgical Engineers, N. Y. City, Feb. 17-19.

Sixth Packaging Exposition, Hotel Pennsylvania, N. Y. City, Mar. 3-6.

American Society for Testing Materials, Regional Meeting, Wm. Penn Hotel, Pittsburgh, Mar. 4.

Oil Men's Association of New England, Boston, Mass., Mar. 11-12.

American Association of Petroleum Geologists, 21st Annual Meeting, Tulsa, Okla., Mar. 19-21.

American Water Works Association, Kentucky-Tennessee Section, Lexington, Ky., Mar. 23-25.

American Ceramic Society, 1936 Annual Meeting, Columbus, Ohio, Mar. 29-Apr. 4.

American Water Works Association, Canadian Section, Annual Convention, Royal Connaught Hotel, Hamilton, Ont., Apr. 1-3.

American Water Works Association, Indiana Section, Purdue Univ., Lafayette, Ind., Apr. 7-9.

American Chemical Society, 91st Meeting, Kansas City, Mo., Apr. 13-17.

National Petroleum Association, Semi-Annual Meeting, Cleveland Hotel, Cleveland, Apr. 16-18.

Electrochemical Society, Spring Meeting, Cleveland, Ohio, Apr. 23-25.

American Gas Association, Natural Gas Dept., Annual Meeting, Dallas, Tex., May.

6th National Premium Exposition, Palmer House, Chicago, May 4-8.

American Institute of Chemists, Annual Meeting and Medal Presentation, Buffalo, N. Y., May 9-10.

American Petroleum Institute, Mid-Year Meeting, Mayo Hotel, Tulsa, Okla., May 13-15.

Natural Gasoline Association of America, Mayo Hotel, Tulsa, Okla., May 13-15.

International Petroleum Exposition and Congress, Tulsa, Okla., May 16-23.

American Gas Association Production and Chemical Conference, N. Y. City, May 25-27.

American Association Cereal Chemists, Annual Meeting, Adolphus Hotel, Dallas, Tex., June 1-5.

American Water Works Association, Annual Convention, Biltmore Hotel, Los Angeles, Cal., June 8-12.

American Society of Mechanical Engineers, Dallas, Tex., June 17-20.

Chemical Engineering Congress, Central Hall, Westminster, England, June 23-27.

American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 29-July 3.

American Chemical Society, Semi-Annual Meeting, Pittsburgh, Sept. 7-12.

American Gas Association Convention, Atlantic City, N. J., Week of Oct. 26.

American Association Textile Chemists and Colorists, Annual Meeting, Providence, R. I., Dec. 4, 5.

"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

LOCAL*

Mar. 6. N. Y. Section, A. C. S. William H. Nichols Medal. Joint meeting with Society of Chemical Industry, Hotel Pennsylvania.

Mar. 19. Drug & Chemical Section, N. Y. Board of Trade, Annual Dinner, Waldorf-Astoria.

Apr. 10. N. Y. Section, A.C.S., Regular Meeting.

* Meetings held at Chemists Club unless otherwise noted.

TAPPI to Discuss Materials Specifications

Lime, Saltcake and Casein Among the Chemicals To Be Discussed—Industry Will Mark 50th Anniversary of the Hall Aluminum Electrolytic Process—Association Briefs—

An innovation at the annual meeting of the Technical Association of the Pulp and Paper Industry, Feb. 17 to 20 at the Waldorf-Astoria, N. Y. City, will be the consideration that will be given for the 1st time to the preparation of specifications for non-fibrous raw materials. At the 1st general session, John Traquair, general chairman of TAPPI raw materials division, will outline the general plan of the Technical Association.

An open meeting will be held during the session of the alkaline pulping committee on Monday afternoon, Feb. 17th, at which time the possibilities regarding the development of specifications for lime and saltcake will be discussed.

On Tuesday afternoon during the session of the coated paper committee an open meeting will be held to discuss possible specification developments for casein. All buyers and sellers of these commodities are urged to be present and to enter into the discussion to guide the committee in their work on specifications. Representatives of the American Society for Testing Materials will be present to show how that organization has accomplished its excellent work along similar lines.

Celebration of the 50th anniversary of Charles Martin Hall's discovery of the electrolytic process for the reduction of aluminum will be held by the Electrochemical Society at a subscription dinner at the Starlight Roof of the Waldorf, N. Y. City, Feb. 17th. Invited guests will be members of the Electrochemical Society, the Institute of Metals of the American Institute of Mining and Metallurgical Engineers, and of the Aluminum Industry. Occasion will also celebrate the 25th anniversary of the award of the Perkin Medal to Hall, and all the living Perkin medalists have been invited to attend as guests of honor.

Among the speakers will be Homer H. Johnson, of Cleveland, a classmate of Hall, Dr. Frederick M. Becket, vice-president, Electro Metallurgical Corp., and former president of both the Electro-Chemical Society and the Institute of Mining and Metallurgical Engineers. Dr. Alexander Klemin, of the Guggenheim School of Aeronautics, will discuss the role of aluminum in the transportation industry.

Association Notes

Hon. S. Davis Wilson, Henry H. Heimann, executive manager of the National Association of Credit Men, and Sir Frederick McGill of London were the guest speakers at the 75th annual dinner of the Philadelphia Drug Exchange held at the Bellevue-Stratford on Jan. 30th.

Du Pont's rubber chemicals division manager, E. R. Bridgewater, will discuss "Economics of Synthetic Rubber" before the American Section, Society of Chemical Industry, Feb. 21st, at the Chemists' Club, N. Y. City. A dinner will precede the meeting.

N. Y. Chemists Club celebrated its 25th Anniversary late last month with a beefsteak dinner for members and guests. Prof. Marston T. Bogert was toastmaster.

Kansas City Section of the American Association of Cereal Chemists met for luncheon and business meeting, Jan. 8th, in the Hotel Phillips. On the 11th, the Section held their big Winter Bridge Dinner at the Ambassador Hotel. The annual convention of the association will be held at the Adolphus Hotel, Dallas, June 1-5. H. W. Putnam, R. R. No. 3, Box 569, Evansville, Ind., is secretary.

Beck, Koller's Dr. Wilhelm Krumbhaar and N. J. Zinc's Sidney Werthan were the speakers at the January meeting of the N. Y. Paint and Varnish Production Club. Malcom Pratt, Socony-Vacuum, is the new president of the club.

January Chemical Consumption is Disappointing

Purchasing Agents Disregard Inflation Fears and Limit Orders to Immediate Needs—Pick-Up Looked For In February—Tin Salts Go Lower—

Purchasing of industrial chemicals in January was but routine with consumers restricting commitments. This development was somewhat in the nature of a disappointment to many producers who felt that with the year-end inventory period out of the way consumption would again "hit the pace" of last Fall and more particularly the tonnages moved in October and November.

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
Sodium silicofluoride	$0.05¼	$0.05
Sodium stearate	.21	.20

DECLINED

	Jan. 31	Dec. 31
Alum, ammonia, del'd N. Y., gran.	$2.90	$3.40
lump	3.15	3.65
Powd.	3.30	3.80
Alum, potash, del'd N. Y., gran.	3.15	3.65
Lump	3.40	3.90
Powd.	3.55	4.05
Antimony oxide	.14	.15
Antimony sulfide	.12	.12½
Potassium metabisulfite	.13½	.15½
Sodium antimoniate	.13¼	.13¾
Sodium tungstate	.85	.90
Tin oxide	.51	.54
Tin tetrachloride	.24¾	.25

DEPT. OF LABOR STATISTICS

	Dec.'35	Nov.'35	Dec.'34
Employment a	108.8	109.5	103.9
Payrolls a	102.1	101.9	90.0

DATA FOR PROCESS INDUSTRIES

	Dec.'35	Nov.'35	Dec.'34
Explosives:			
Employment a	86.7	89.9	90.6
Payrolls a	76.2	80.2	70.7
Soap:			
Employment a	97.3	103.7	99.6
Payrolls a	94.6	98.3	90.7

	Dec. '35	Nov. '35
Exports	$1,755,000	$2,348,000
Imports	1,382,000	1,282,000
Crude sulfur, exports	839,000	703,000
Indus. Chemical Specialties, exports	987,000	1,130,000

a 1923-25 = 100.

Further, many producers were encouraged at the willingness of purchasing agents to increase quantities specified in yearly contracts over the tonnages contracted for in '35, but it appears that in many instances the buyers were merely providing themselves with protection against possible inflation, and until the general political situation clarifies itself the additional tonnages cannot be taken too seriously and in themselves they are not a sure indication of further basic improvement in business.

January saw a slackening in the demand for plating chemicals. This condition was expected as a result of pushing the annual automobile show ahead 2 months and is likely to be but a very temporary one. Conditions are still somewhat slack in the textile field. In the Paterson area the conditions are very discouraging and the price structure of chemicals weak. Shoe production has as yet failed to pick up much momentum caused by the fact that manufacturers are awaiting the results of the Boston and Chicago shows before going into heavy production schedules. Paint producers are just now getting really started on the spring production pick-up. The paper industry is quite active.

With December production of polished plate glass in excess of 16,000,000 sq. ft., total output of polished plate glass in '35 aggregated 179,816,459 sq. ft., the largest production of any year in the history of American plate glass. Much of the production went into safety glass which requires 2 sheets so that comparisons with former active years cannot be as accurate as they might be. Production in '34 totalled 94,566,978 sq. ft. With building gaining and use of safety glass jumping in leaps and bounds, the glass industry looks to '36 with confidence despite the uncertainty over canned beer.

Consumption of newsprint this year will show a gain of about 10% over '35, manufacturers predict, owing in part to the effects of the coming national election. A gain of such proportions would carry the year's output above the '30 level.

Watson, Bell Join N. A. M. Board of Directors

Clark Is '36 Nichols Medalist—Giauque Chosen For Chandler Award—Howe Honored by American Institute—Other Personal Items—

John J. Watson, I.A.C. president, and W. B. Bell, president of American Cyanamid, are appointed to board of directors of the National Association of Manufacturers.

Nichols Medal of the N. Y. section of the A.C.S. has been awarded for '36 to Dr. William Mansfield Clark, Professor of Physiological Chemistry at Johns Hopkins, "for researches of incalculable value to human welfare." Medal will be presented to Dr. Clark at a dinner meeting Mar. 6.

Award of the '35 Chandler Medal of Columbia University to Prof. William Francis Giauque of the University of California for his achievements in thermochemistry is announced.

Gold Medal of The American Institute was awarded to Dr. John C. Merriam at a dinner in N. Y. City early this month. Institute fellowships were also awarded to Dr. Harrison E. Howe and Howard W. Blakeslee. Presentation of awards fell to Mr. Alfred Knight, president of the Institute.

Mainly About People

A. E. Marshall, former A. I. Ch. E. president, speaks before the Patent Office Society in Washington on "Glass—Its History and Industrial Applications."

C. W. Hancock, Commercial Solvent's Peoria plant manager, will return in mid-February from England where he has supervised the completion of the new plant near Liverpool. Plant has begun actual operations.

Alden H. Emery, assistant chief engineer of the Experiment Stations Division, Bureau of Mines, is appointed assistant manager of the A. C. S., a newly created office. Dr. Charles L. Parsons is again secretary and business manager, and R. T. Baldwin is treasurer.

Dr. Robert E. Wilson, vice chairman of Pan American Petroleum & Transport, is now director-at-large for a term of 3 years. Prof. Arthur J. Hill, Yale, and Dean Frank C. Whitmore, Penn. State, are regional directors for the eastern states.

Walter Brown, Victor Chemical Works treasurer, has returned to his desk from Florida where he spent last month recuperating from recent serious illness.

Tendered resignation of G. F. Dressel, of Ethyl-Dow Chemical, from the Wilmington, N. C., port commission was not accepted, board voting to request Mr. Dressel to continue on the body.

Ernest T. Trigg, N. P. V. & L. A. president, has protested against the use of his name as a member of one of Major Berry's committees.

Thomas D. Cabot, treasurer of Godfrey L. Cabot, is elected a director of the New England Trust Co.

George A. Anderson, Pfizer vice-president, was tendered a testimonial luncheon on Jan. 10th, commemorating the completion of 25 years' service.

Dr. Wilbert J. Huff, Johns Hopkins, is appointed chief chemist, Explosives Division of the Bureau of Mines.

David Wishnick, Wishnick-Tumpeer, returns to his Chicago office after recuperating from pneumonia at Miami Beach.

Andrew J. Kelly, Burkart-Schier chemist, is now president of the Chattanooga Engineers' Club. He was in charge of the program of the recent A.A.T.C. & C. convention.

Consolidated Feldspar's V. V. Kelsey heads the Ceramic Association of N. J. for '36.

Adolf M. Hamann, du Pont consulting engineer, has been loaned to the city of Niagara Falls in order that he may reorganize the city welfare department and place it on an efficient, economical basis.

Du Pont's Dr. I. H. Godlove spoke on "Color: Visually and Physically" before the N. Y. Section, A. A. T. C. & C., on Jan. 31st, at the Alexander Hamilton in Paterson, N. J.

Expansion Continues

New Year Sees No Let-Up In Encouraging Reports On Plant Expansion—

Plans for a $500,000 expansion program for American Cyanamid and Chemical, calling for a new sulfuric acid plant on the company's property near Joliet, Ill., and the construction of a dock along the waterway, are announced by H. L. Derby, president. Chemical Construction Co., N. Y. City, will built the acid plant.

General Dyestuff leases an entire block front on Hudson st., between Leroy and Morton sts., N. Y. City, where it plans to erect a 9-story building to be occupied for offices, laboratories, storage, and shipping. Foundations will be laid to permit 3 additional stories when needed.

A gas polymerization plant of the thermal type will be erected at the Atreco, Texas, refinery of Atlantic Refining, with a capacity of 1200 bbls. per day of polymerized gasoline. Plant will be erected by The M. W. Kellogg Co. and will be operated under license from The Polymerization Process Corp.

Spencer Kellogg is starting a $300,000 plant at Long Beach, Calif., to make linseed, coconut oils.

Paper Makers' Chemical plans immediate construction of a chemical products manufacturing plant near Marrero, La. Estimated cost is $75,000.

Compressed Gas Makers hold most successful meeting in years.

Full Removable Head Steel Drums

Simplest and Strongest for Service and Satisfaction

10 to 72-gallon capacity : 24 to 20 gauge

EASTERN STEEL BARREL CORPORATION

BOUND BROOK, NEW JERSEY

Church & Dwight, Inc.

Established 1846

70 PINE STREET NEW YORK

Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

Standard Quality

Sheffield, well-known N. Y. milk company, will spend $150,000 for chemical plant at Wood's Corner, near Norwich, N. Y.

Company Notes

Commercial Solvents distributed life insurance policies to its employees last month. Amounts of individual policies ranged according to wage. Over 1,400 employees, including subsidiaries of Commercial Solvents, benefited by this "Santa Claus" act.

George H. Lincks, N. Y. City importer of gums, is sole agent for a new 98½% Kauri which has just been made possible by the introduction of revolutionary method of refining.

Benner Chemical salesmen held annual sales convention in company's Chicago offices late last month. First year men at the meeting included R. L. Brown, J. Fellers, L. R. Fink, F. W. Reif and C. H. Stoddard.

Truempy, Faesy & Besthoff has changed its corporate name to Faesy & Besthoff, Inc. Personnel, address, etc., continue unchanged.

Corn Products is planning to refund on processing taxes.

Teal Chemical is organized at Birmingham, Ala., to make calcium carbide.

Toledo Synthetic Products, Inc., makers of Plaskon, colorful urea molding material, announces change in name to Plaskon Co., Inc.

Standard Oil Co. (N. J.) formulates a new pension plan designed to supplement provisions of the social security act passed by Congress.

Abbott Laboratories did a record business in '35.

Blacks, Inc., is a new manufacturer of lamp black with a plant at Casmalia, Cal. C. K. Williams and O. C. Field Gasoline are the joint owners. C. K. Williams will have charge of the eastern sales division; George S. Mepham Corp., E. St. Louis, will have the central division, while the Pacific Coast territory will be covered by Marshall Dill, San Francisco.

Southern Naval Stores, Columbia, Miss., recently organized with capital of $160,000, has started construction of a steam solvent wood reduction plant for the manufacture of turpentine, pine oil and rosin as the main products, and other by-products including disinfectant and net dip.

At New Addresses

Joseph Turner & Co.'s new Chicago office is at 43 E. Ohio st.

International Selling is now in larger quarters (the entire 15th floor) at 26-28 Beaver st., N. Y. City.

Mountain Copper Ltd. moves to 351 California st., San Francisco.

University of Wyoming has erected a building on its campus to provide quarters for the Petroleum Experiment Station of the Bureau of Mines.

Reported from the Plants

Operations have been resumed at the Niagara Falls plant of the Aluminum Company of America for the 1st time since the closing of the plant on July 31, '31.

Grasselli Chemical's East Chicago plant was awarded, recently, the general manager's safety prize of the Du Pont organization, parent concern, for operating 374 days or 1,450,000 exposure hours without a single lost time accident. Grasselli won the coveted award in a field of 87 du Pont plants which competed. The East Chicago plant has 850 employes.

Lindsay Light and Chemical is planning to move its Chicago plant to West Chicago, Ill. in June.

Operations of the Southern Mineral Products plant at Piney River are reduced temporarily.

Shortage of Crude Naphthalene Feared

Price Nominal At $3.50—Importers Raise Cresylic As Stocks Become Scarce—Coal Tar Solvents Are Firm—Coke Production Again Rises In December—

An acute international shortage of crude naphthalene is threatened and prices in this country might well be classed as nominal at $3.50 per 100 lbs. Germany is reported as having placed an embargo on exports and at least one other European country is expected to follow suit. The political situation abroad plus the fact that a change of manufacturing processes in some cases has taken place makes the whole situation one of extreme uncertainty. Users of refined material are worried for the active season is close at hand.

Cresylic supplies, too, are scarce, and importers were forced to raise quotations last month. Part of this scarcity can be laid at the increasing demand from the synthetic resin field. Producers and consumers of cresylic acid are looking for still higher prices before very long.

With steel operations at but 50% of capacity, coking operations are still far from normal. The result, of course, is a continued shortage of spot stocks of such coal tar chemicals for which good demand exists. This is the real reason in back of the scarcity of toluol, xylol, solvent naphtha and some of the more popular intermediates.

Production of coke continued its upward trend in December. Daily rate of production from byproduct and beehive plants, amounting to 113,477 tons, was 5.3% greater than the November rate of 107,758 tons, and 39.5% above the rate prevailing in December a year ago. Output of byproduct coke for the 31 days of December totaled 3,368,118 tons, a daily average of 108,649 tons, highest rate recorded since October, '30. Compared with November, December average rose 4.6%. Bulk of the increase occurred at furnace plants, where the operating rate rose 6.0% Production of beehive coke increased sharply during December. Stock piles at byproduct plants decreased 8.2%, from 3,026,192 to 2,779,509 tons, lowest level reached since August, '34.

Production of coke in '35, according to a preliminary report received by the Bureau of Mines, was 35,209,240 net tons, an increase of 10.6% when compared with '34. All of the increase occurred at plants affiliated with iron interests, where a gain

Important Price Changes

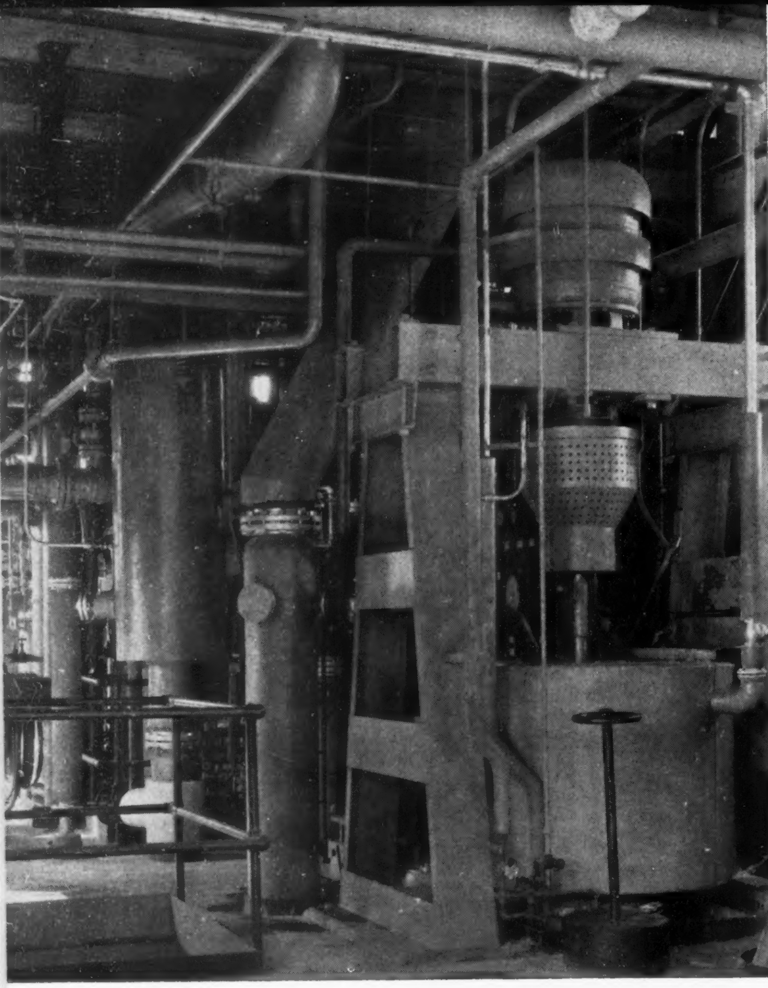
ADVANCED

	Jan. 31	Dec. 31
Acid cresylic, imp.	$0.58	$0.53
Naphthalene, crude	3.50	3.00
Solvent naphtha, high flash, tks.	.31	.30
Drs.	.36	.35

Chemistry in a new role. Monsanto employees at St. Louis stage a minstrel show for the benefit of the poor living near the plant.

CHEMICAL

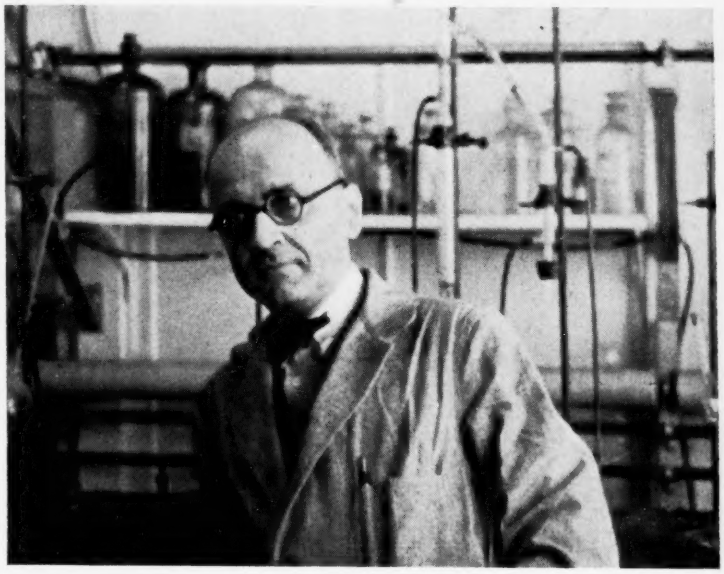
The Photographic Record

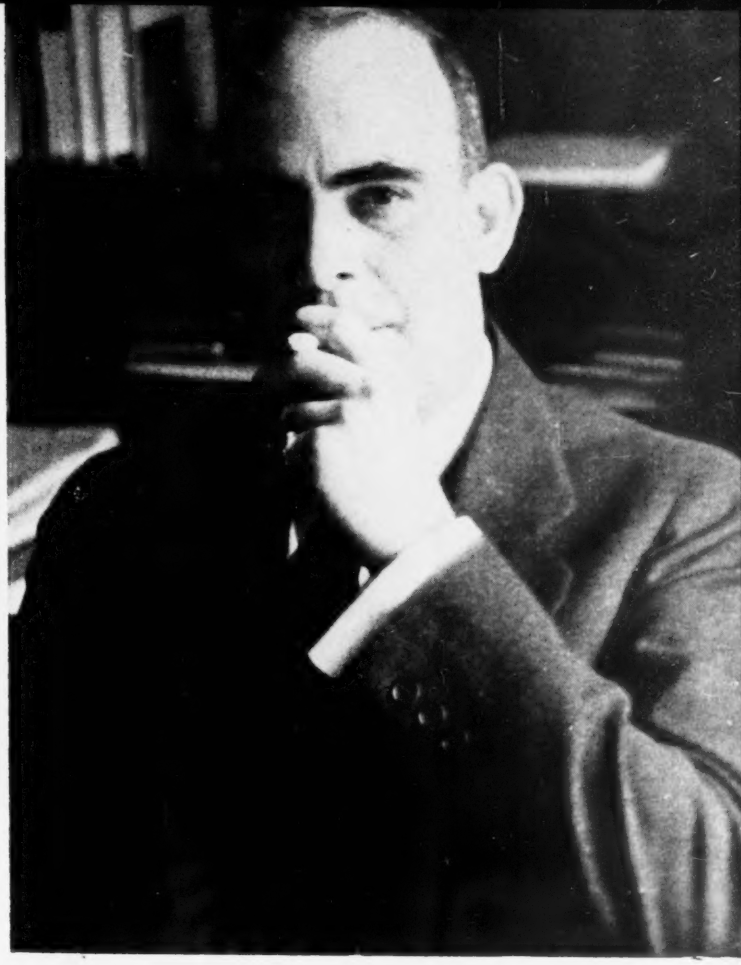


Upper left, close-up of the centrifuge in du Pont's new crystal urea plant, at Belle, W. Va., the first commercial production in the U. S. Above, in Rochester, the Candid Camera catches Samuel J. Cohen, president, American Chemical Products Co., over the coffee-cups. Left, executive committee, Drug, Chemical & Allied Trades Section, New York Board of Trade, is host to the press and prominent executives in the drug and chemical fields. Publicity plans for the 11th Annual Dinner, March 19th, were discussed. Below and right-hand page, annual dinner held during convention of the National Ass'n Dyers & Cleaners, at Wardman Park Hotel, Washington, D. C.

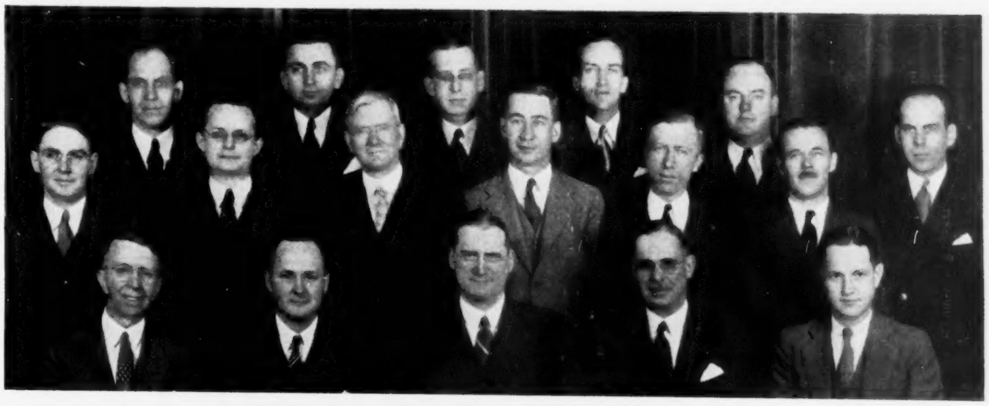
NEWS REEL

of Our Chemical Activities





Right, Caesar Grasselli, III. Cleveland—Wilmington—now London. Left, a little further on, in St. Louis, the Candid Camera snapped Dr. L. P. Kyrides, director research, Monsanto Chemical, at work in the laboratory. Right, the sales staff of Philadelphia Quartz. Seated (left to right)—William H. Buxton: Edwin A. Russell, sales manager; J. Passmore Elkinton, vice-president; Carl F. Wolcott, assistant sales manager; John C. Russell. Second row (l. to r.)—Orien Van Dyke, H. Henry Brandreth, Richard C. Brown, John W. Wichterman, Lloyd W. Wright, William P. Wood, LeRoy R. Fischer. Third row (l. to r.)—Robert L. Kreyling, F. Homer Bell, F. Robert MacGonagle, Fred J. Henning, John R. Jones.



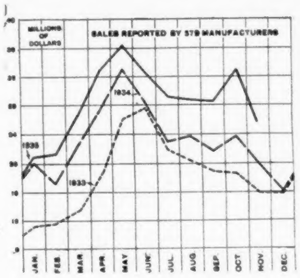
of 19.5% was made; at merchant plants production declined 2.3%.

Using the same yield of coke and by-products per net ton of coal charged in by-product ovens in the U. S. in '34, which was 2.90, light oil was recovered to the extent of 143,488,180 gals., as compared with 128,594,694 in '34. Net tons of coal charged in by-product ovens amounted to 49,478,683 tons as compared with 44,342,-998 in '34. Average '34 yield of tar was 9.22, and using the same yield the '35 tar recovery was estimated at 456,193,447 gals. as compared with 408,842,441 in the same period '34. Total production of crude and refined and motor benzol in '35 was estimated at 78,851,000 gals. as compared with 71,737,489 in '34. Number of plants making benzol or motor benzol was 52, with a net ton of coke capacity per day of 137,357. Ammonium sulfate or equivalent in all forms was estimated at 531,710 net tons as compared with 471,800 tons in '34.

Paint Makers Delay Spring Operations

Cold Snap Blamed By Raw Materials Dealers For Lack of Interest Last Month—'35 Paint Sales Up 21% Over '34—January Motor Production Off From Early Estimates—Beck, Koller Sales Gain 80%—

January was a quiet month in raw paint materials markets. There was little snap to the trading in most items. Those who expected an immediate pick-up after the turn of the year were naturally disappointed, but there is every reason to believe that this situation is but temporary; that paint manufacturers will shortly step up production schedules in anticipation of the best Spring business since '29.



Trend in paint sales.

Total '35 sales of paint, varnish and lacquer products as reported by the Bureau of Census from 579 establishments were valued at $234,277,609 compared with $276,206,117 in '34 and $220,-303,893 in '33. Figures show classified sales reported by 344 establishments of $99,035,951 in industrial sales and $130,-355,319 in trade sales. These compare with '34 sales of $77,614,508 in the industrial group and $108,506,469 in the trade sales group. The '33 figures were $60,140,098 in the industrial sales group and $91,572,769 in trade sales. A breakdown of industrial sales reported by 344 establishments in '35 shows sales of $70,-099,360 in paint and varnish and sales valued at $28,936,591 in the lacquer division.

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
Cadmium sulfide, orange	$1.00	$0.90
Cadmium lithopone red, light	.65	.60
Medium light	.70	.65
Medium	.75	.70
Deep	.80	.75
Maroon	.90	.85

DECLINED

Blue Victoria ink toner	$0.80	$0.85
Calcium sulfide, luminous	.60	.80

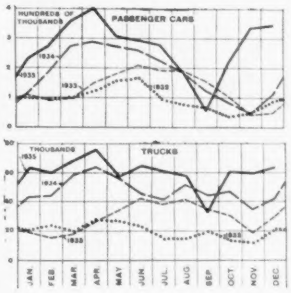
DEPT. OF LABOR STATISTICS

	Dec.'35	Nov.'35	Dec.'34
Employment a	108.1	109.3	99.5
Payrolls a	94.1	94.0	78.1

	Dec. '35	Nov. '35
Pigments, Paints and Varnishes, exports	$1,579,000	$1,722,000

a 1923-1925 = 100.0.

January motor ouput was expected to be 390,000 units, but in the last half of the month some recessions in the Detroit area were reported and production may have been as low as 225,000-250,000 units. Retail sales were hampered somewhat by adverse weather but ran ahead of January, '34, by 20% and but 15% below December. Because of the earlier introduction of models this season production and sales in February are expected to show a decline and tentative production schedules now call for 300,000 units. An upturn should take place in March and April. Producers see no reason to change their forecast of 5,000,000 cars for '36, and the passage of the Soldiers' Bonus bill is advanced by several as sufficient reason for revising this figure upward by at least another quarter of a million.



Trend in production of automobiles.

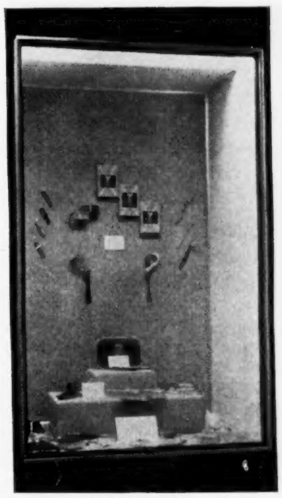
An Achievement Record

Beck, Koller sales in the 10 years of the company's existence have jumped from less than $100,000 in '25 to over $5,000,000 in '35. Sales last year were approximately 80% greater than '34's total.

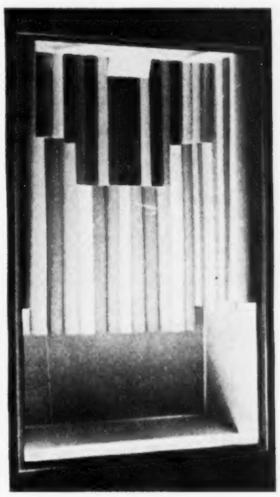
Productive capacity of domestic plants have been doubled in the past year with 30,000 sq. ft. added to the Detroit factory and branch plants established at San Francisco and Elizabeth, N. J. The latter plant now consists of 6 buildings, 3 acres of ground, 52,000 sq. ft. of floor space, and a storage capacity of 220,000 gals. New and larger buildings are now

LACQUERED PAPER

PROCESS AIDS



PLASTIC



PAPER

Window shopping at the recent Chemical Exposition. Hercules Powder's display was easily the most pretentious of the exhibit. Built across a corner, the display resembled the front of a Fifth avenue shop. A doorway, with 4 windows on each side, led into a private conference space where representatives answered questions on the varied Hercules' line.

being erected at Liverpool, Eng., and a branch plant is being constructed at Paris. Production capacities at Vienna and Hamburg were also greatly expanded last year. Over $300,000 will be spent by the company in '36 for expansion.

Company News

Zapon Brevolite Lacquer, Atlas subsidiary in Chicago, plans expenditure of more than $100,000 for new warehouse, boiler plant, and miscellaneous equipment and plant improvements.

C. A. Carlton, widely known research and development engineer, is appointed manager, Development Division, J. M. Huber Corp., with headquarters at Borger, Tex., where he will devote his time to research problems involving the manufacture and use of Huber carbon blacks and clays. He has been associated with the rubber industry since '16.

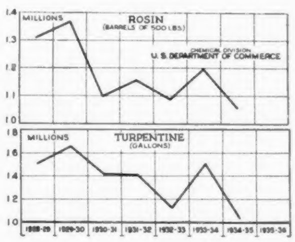
Krebs Pigment & Color, which has manufactured and sold titanium dioxide for the last several years without designating it by a trade name, announces that it will now be known as "Ti-Dox."

The Alabastine Co. is entering the oil paint and enamel field.

Naval Stores Sag Further

Threat of Government Stocks Hangs Over Market

Naval stores prices lost ground in January and there is very little bullish sentiment over the possibility of any substantial rise in the near future. While the statistical picture at the primary ports has improved somewhat, the threat of the Government stocks hangs heavily over the market. Despite a number of meetings with Washington officials, the industry's leaders are still very much "in the dark" as to what policy will be finally adopted for the disposition of these stocks. A new season is now quite close at hand and there is very little likelihood of any voluntary or involuntary plan of production restriction being placed in effect. Finally, the export market continues to be on the whole disappointing. While undoubtedly there will be still further improvement in shipments, both domestic and export, the feeling persists that the picture will not be a particularly bright one over the next 6 months.



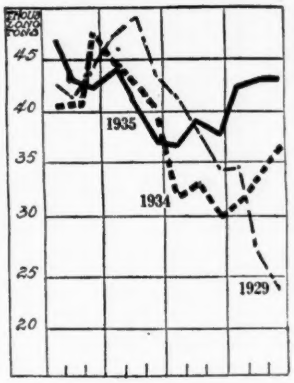
Sharp decline in the naval stores export markets causes anxiety.

Expansion of the naval stores activities of the bureau of chemistry and soils of the Dept. of Agriculture is provided for in the annual budget submitted to Congress Jan. 6 by President Roosevelt.

Solvent Makers Anticipate Heavy Consumption

Petroleum Solvents In Mid-Continent Area Finally Raised ½¢—Weather Aids Sale of Anti-Freeze—Alcohol Prices Except CD 5 Reduced 3¢

Tire production in January in the Akron area averaged 108,000 units as against about 80,000 in January of '34. Tire makers are certain that '36 will show a gain over '35. While a slight decline in the replacement market is likely, the original equipment market is expected to take at least 2,000,000 more tires this year. According to present plans, Akron will take 130,000 tons of crude in the 1st quarter, or over 43,000 tons per month.



Trend in rubber consumption.

With such optimism prevailing it is not difficult to forecast that the record breaking record of '35 in crude rubber of 497,150 tons will be broken this year. December consumption set an all-time high for this month with 42,942 tons consumed.

After several months of price uncertainties in the mid-continent petroleum solvents markets, a more stable condition was brought about late in January when producers placed in effect a general ½c per gal. advance in tank car quotations and also raised the tankwagon quotations in Middle West cities. There was some talk of an upward revision also in Eastern centers, but the month closed without any formal announcement; but consumers on the Atlantic seaboard would not be greatly surprised if such a move were made very early in February.

According to rumors there was some shading in acetone and butyl alcohol, but such action could not be confirmed and, indeed, there was a great deal of doubt that any concessions had actually been made.

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
Cleaners naphtha, tks., Group 3	$0.07⅜	$0.06⅞
Lacquer diluents	.08⅜	.07⅞
Petroleum thinners	.06⅜	.05⅞
Rubber solvents	.07⅜	.06⅞
Stoddard solvent	.06⅞	.06⅜
The V. M. & P. naphthas	.07⅜	.06⅞
Solvent naphtha, high flash, tks.	.31	.30
Drs.	.36	.35

DEPT. OF LABOR STATISTICS

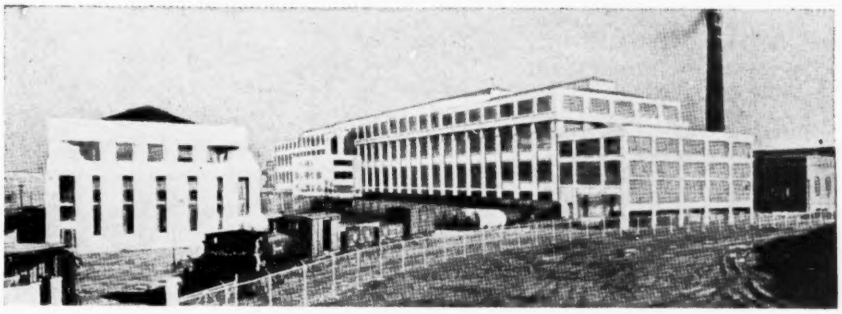
	Dec.'35	Nov.'35	Dec.'34
Petroleum Refining:			
Employment a	109.7	z110.3	110.8
Payrolls a	104.6	z98.8	97.8

	Dec. '35	Nov. '35
Petroleum & Products:		
Exports	$24,650,000	$23,778,000
Imports	3,047,000	2,292,000

a 1923-25=100.0; z Revised.

"Ole Man Winter," that much maligned character, came to the rescue of anti-freeze markets last month with plenty of vengeance, and stocks which were being described in December as excessive are now called normal. As a result, the possibility of a further break in prices now appears quite remote. But as "One swallow does not make a summer," one cold snap does not make a satisfactory anti-freeze season and February weather holds the answer at this writing.

Industrial alcohol sales over the next few months are expected to show large gains over last year, chiefly owing to increased demand from the solvent industries. Lacquer and varnish makers' takings this Spring are expected to more than double last year's consumption. In addition, consumption in chemical and textile fields is expected to be much larger. Nevertheless, the present optimism failed to stop a 3c reduction in all grades except completely denatured early in January and applicable to all deliveries prior to Apr. 1.



Factory of Commercial Solvents (Great Britain) Ltd., at Bromborough Port Cheshire, near Liverpool, is now in production.

Lower schedule brings the solvent grade down to 29c a gal. in tank cars; 34c in

drums, carlots; 36c for 20 drums, and 39c a gal. for one to 19 drums.

Specially denatured No. 1 is now available at 28c in tanks. Carlots are quoted at 33c in drums; 20 drums, 35c; 5 to 19 drums, 39c, and one to 4 drums, 41c a gal.

New schedule on pure ethyl alcohol, tax paid, is $4.07 a proof gal. in tanks; $4.12 in carlots, drums; $4.14 in 20-drum lots; $4.22 in 5 to 19 drums, and $4.24 in single or 4 drum lots. Barrel prices are 1c over.

Denatured alcohol production during the fiscal year '35 totaled 97,031,074 wine gals., compared with 82,241,403 in the '34 fiscal year, according to the Bureau of Internal Revenue, divided as follows:

	1934 Wine gals.	1935 Wine gals.
Completely denatured..	27,174,311	38,746,679
Specially denatured....	55,067,092	58,284,395

Ethyl alcohol produced in '35 (fiscal year) totaled 180,645,920 proof gals. as against 165,103,582 in '34 (fiscal year).

Production of shoes during January fell slightly below the like period in '35, according to trade estimates. February output may continue around last year's level also, owing to uncertainty over the trend of shoe prices.

Miscellaneous Jottings

Industrial Rayon plans erection of new plant at Cleveland to house the company's improved process, according to H. S. Rivitz, president. New process will turn out bleached cones of superior quality rayon at the rate of 8,000,000 lbs. a year, it is stated.

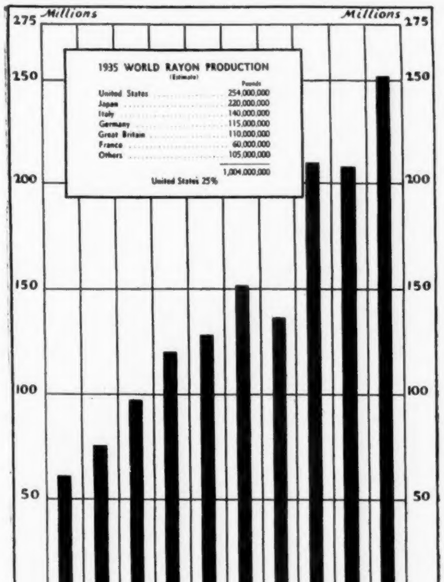
Charlotte, N. C., is the home of 2 new chemical companies, Southern Chemical Corp. and Southern Dyestuff Corp.

Textile, Leather Chemicals Slow in January

Heavier Manufacturing Schedules Planned For February—End of AAA Causes Lower Starch and Dextrin Quotations—'35 Rayon Volume Sets New Record—

Both the textile and leather industries purchased chemicals in January on a very conservative basis. There is no cause for alarm in this situation for January rarely is a very active month in either field. Shoe producers were said to be definitely awaiting the outcome of the Chicago and Boston shows before speeding up production to more normal levels.

The end of the AAA by order of the Supreme Court had many repercussions in the raw materials markets, and starch, dextrin and glucose were included in the declines. With so much uncertainty now existing over the farm relief problem, buyers of commodities, such as starch and dextrin, are unwilling to contract ahead and generally are holding to small but more frequent purchasing policies. Competition among producers of sulfonated oils remained unchanged in January, and while no definite price reductions have been announced, the price structure is decidedly not one of firmness.



Courtesy of the Melliand

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
None.		

DECLINED

	Jan. 31	Dec. 31
Dextrin, corn	$3.45	$3.60
British Gum	3.70	3.85
White	3.40	3.55
Divi-Divi	34.00	36.00
Starch, pearl	2.99	3.13
Powd.	3.09	3.23
Myrobalans J1	23.00	23.50
J2	14.50	15.00
R2	14.00	15.25
Sumac	53.00	54.00

Rayon's Encouraging Volume

From figures made available it is shown that '35 production topped 250,000,000 lbs., a gain of 40,000,000 over '34. Thus goes the onward march of the rayon industry. It constitutes the one division of business that has expanded, year after year, during the period of general world depression.

The silk picture today looks considerably less bright than it did a short time ago. Prices have experienced a severe drop since last October, and many in the trade doubt that the decline has already run its course. Approximate deliveries of raw silk to the mills during December totalled 35,559 bales, a drop of 3.9% under November and of 13.1% under the same month a year ago.

There is considerable talk of a wholesale N. Y. dress strike within the next few months and the textile industry is apprehensive. Such action would likely affect rayon more than silk for the cheaper price goods would feel the brunt of a strike. At present 60 to 65% of raw silk is consumed in hosiery, but this is no cause for much optimism for jobbers are considerably overstocked with hosiery.

The cotton spinning industry was reported recently by the Census Bureau to have operated during December at 103.8% of capacity, compared with 101.1% in November and 87.1% in December a year ago.

The acute shortage of domestic raw wool supplies points to even higher prices for the fiber, according to many in the trade.

Mercury Continues Firm

Mercurials Finally Advanced—Several Cadmium Salts Are Revised Upward—

Producers of fine chemicals report production and shipments in January at a very satisfactory level. Seasonal winter items, particularly, moved out in good quantities. The price structure generally is holding up remarkably well.

Supplies of mercury are small, and the market for this commodity is decidedly firm. Even the highly competitive condition existing between manufacturers of mercurials failed any longer to hold down prices, and advances were made in January to bring sales prices more nearly in line with the present market for quicksilver. Several of the important cadmium salts were finally advanced too, the direct result of higher levels for the metal. No change has yet been made in quotations on bismuth salts, but they are firm, and in certain quarters there is talk of possible increases in the near future. Glycerine is still firm and spot supplies scarce. Further weakness in the international silver market brought about another downward revision in silver nitrate, and consumers generally are holding to a bearish attitude.

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
Cadmium bromide	$ 1.54	$ 1.30
Iodide	3.90	3.70
Calomel	1.08	1.01
Corrosive sublimate	.81	.76
Mercury	77.00	76.00
Mercury oxide, yellow, U. S. P.	1.69	1.50
Red, U. S. P.	1.44	1.34
White, U. S. P.	1.46	1.36
Sodium sulfocarbolate	.27	.26

DECLINED

	Jan. 31	Dec. 31
Camphor slabs	$0.55	$0.56
Powd.	.55	.56
Corn syrup, 42°	3.05	3.18
43°	3.10	3.23

DEPT. OF LABOR STATISTICS

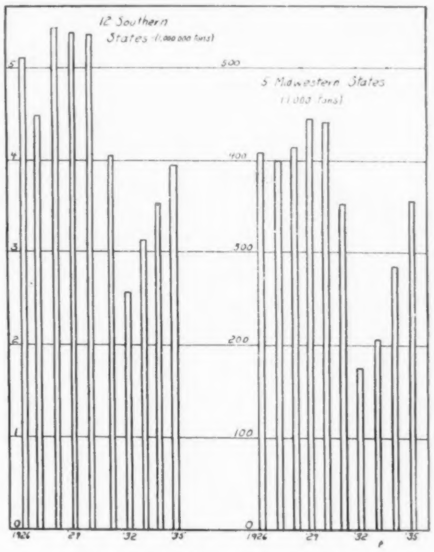
	Dec.'35	Nov.'35	Dec.'34
Employment, Druggist's preparations, a	98.8	100.3	102.8
Payrolls, Druggist's preparations a	97.2	94..7	94.8

a 1923-1925 = 100.0.

Volume May Offset Lower Fertilizer Prices

End of Crop Control Expected To Increase '36 Tonnage—Fertilizer Sales In '35 Ahead of Previous Year By 13%—Little Current Trading In Raw Materials—December Superphosphate Production Higher—

Differences of opinion exist in the trade over the outlook. Current mixed fertilizer prices are below the levels prevailing last Spring, but many manufacturers hope that increased volume will offset lower prices. Cotton, tobacco and corn acreage (the important fertilizer consuming crops) will be larger, even if Congress does enact an AAA substitute. Further, the F.T.C. is expected to approve the proposed trade practice rules which will, it is hoped, eliminate much of the cut-throat competition.



Graphic comparison of tag sales in last 10 years.

A rather doleful picture of the outlook was painted by V.-C. officials in a letter to stockholders. Breakdown of the Administration's alphabetical bureaus has hit the fertilizer industry particularly hard. The end of NRA broke down the price structure, and the recent demise of the AAA has confused acreage plans. Nevertheless, many fertilizer officials refuse to take a pessimistic view of the situation. They point to the fact that fertilizer consumption in '35 in the South reached 3,950,000 tons, largest in 4 years, and an increase of 11% over '34 and 51% over the depression low of '32. They feel that '36 tonnage will more than equal that of last year.

Fertilizer mixers also point out, that although the new price lists for mixed goods are averaging about $1.00 a ton lower, that raw materials, notably phosphate rock, are lower.

One important factor to consider is the question of credit. Planters, owing to the Government cotton loan scheme, were able to get more credit, but this season fertilizer buyers will be forced to produce cash, and this situation may hinder sales to a certain extent—how much, no one knows. Offsetting this, however, is the fact that the farmers are now in possession of the greatest amount of cash they have had in years.

The season usually runs from January to April with March the peak month in the South. Fertilizer sales outside of these months constitute but a small part of the total. Percentage of fertilizer tax tags sold in January, using '31, '32, '33 and '34 as an average, amounted to 8.1%; February 13.2%; March, 30.3%; and April, 28.4%.

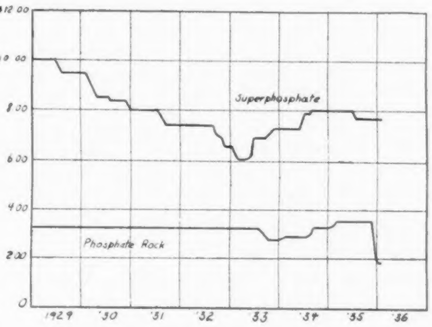
I.A.C. president, John J. Watson, asked last month to comment on the AAA decision, stated:

"I think the country generally has been expecting the decision that the AAA was unconstitutional.

"I am glad to see the restriction raised on the operations of our farmers for I do not believe there is any place in American farm life for a law which calls for the destroying of hogs, the plowing under of cotton and the destruction of food crops when there are so many people in need of these necessities of life.

"The shock to agriculture at the present time, if any, will not be as great as it would be later if there had been a further building on the artificial basis created by the AAA."

Reflecting a continuation of the rise in farm income which began in the Spring of '33, fertilizer tax tag sales in reporting states increased almost 13% in '35 over '34, rising to approximately the '31



Trend in superphosphate and rock prices in last 7 years.

level and marking the 3rd year of improvement. Sales in 17 reporting States in '35 totaled 4,317,860 tons compared with 3,838,873 tons in the preceding year, 2,798,259 tons in the depression low year of '32, and 6,001,336 tons in '30. The 5 Midwestern States, in the aggregate, experienced a 23% rise in sales in '35 over the preceding year.

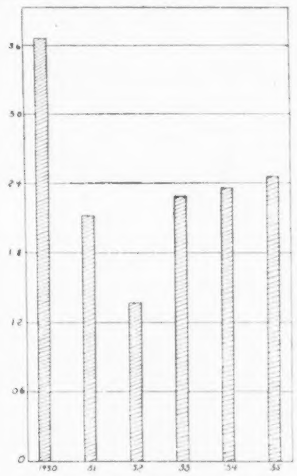
Trading in raw fertilizer materials was again very quiet. Aside from the serious

Important Price Changes

ADVANCED	Jan. 31	Dec. 31
Blood, dried, N. Y.	$3.10	$3.00
Imp., N. Y.	3.00	2.95
Chicago	3.50	3.25
Bone, raw, imp., 4½ & 50	27.00	24.00
Calcium phosphate, precip.	.61	.59
DECLINED		
Bonemeal, imp., 3 & 50	$23.25	$24.00
Castor Pomace, dom.	15.50	16.00
Hoofmeal, Chicago	2.50	2.60
Nitrogenous material, imp.	2.25	2.30
DEPT. OF LABOR STATISTICS	Dec. '35	Nov. '35
Fertilizers & Materials:		
Exports	$1,294,000	$1,895,000
Imports	2,990,000	3,196,000

battle between phosphate rock producers in December there has been a remarkable dearth of activity for this period of the year. Much of this lack of action is blamed upon the uncertainties that have arisen following the demise of the AAA and the intense cold spell which has afflicted even the far South for several weeks.

Production of superphosphate in December increased seasonally over November, but was slightly under December, '34, output. A substantial increase over the preceding December was reported by producers in the Northern Area, but this was slightly more than counterbalanced by the decline in Southern production. Total production in '35 was the largest for any year since '30; production in the South, however, was somewhat less in '35 than in the preceding year.



Production of superphosphate shown graphically.

December shipments of bulk superphosphate to mixers increased sharply from November and were the largest for the month in several years.

Phosphate Rock Institute has published table showing phosphate rock deposits in places outside the U. S. Analysis data and estimated reserves are included in the table which may be obtained through H. B. Carpenter, secretary, 30 Church st., N. Y. City.

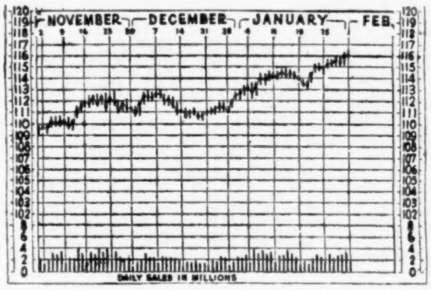
E. A. Buck has retired from H. J. Baker & Bro., N. Y. City. Business will be continued under the remaining partners—Henry V. B. Smith, Charles D. Rafferty and Harold S. McCormick.

Stocks Advance for 11th Consecutive Month

With Trend Mixed Chemical Group as a Whole Registers 4% Rise—Allied Calls Preferred—Du Pont Reports $5.04 a Share —Other Earnings—

The stock market, despite several important uncertainties, made an impressive gain of approximately 7.6% in the 1st month of the new year. This was a gain of more than double the appreciation made in December. Volume of trading was off slightly, however, from the average of the past few months.

Chemical stocks participated in the general advance with but few exceptions,



—N. Y. Herald-Tribune

Market trend in the last 3 months.

including Commercial Solvents, Carbide and U. S. I. Net changes in value for 10 leading stocks were as follows:

Air Reduction	+	$16,825,780
Allied Chemical	+	17,709,499
Commercial Solvents	—	2,308,371
du Pont de Nemours	+	63,627,804
Freeport Texas	+	3,185,520
Mathieson Alkali	+	858,191
Monsanto Chemical	+	6,493,799
Texas Gulf Sulphur	+	15,360,000
Union Carbide	—	3,460,101
U. S. Indust. Alcohol	—	586,857
Total appreciation		$117,705,264
Per cent. gain	4	

Air Reduction Purchases

Air Reduction acquires remaining 13% of the outstanding capital stock of Pure Carbonic, making it now a fully owned subsidiary.

Allied Redeems Preferred

Allied calls for redemption Feb. 14 at $120 per share the issued preferred stock of 392,849 shares of which 47,309 shares are held in the company's treasury. Amount required to redeem the outstanding preferred stock, including accrued dividends, is $41,760,000. Retirement of the preferred will be made out of available funds without recourse to borrowing or other refinancing.

Davison Plan In Operation

Chester F. Hockley is new president of recently reorganized Davison Chemical.

PRESIDENT C. F. HOCKLEY

New head of reorganized Davison Chemical.

He was formerly president of Bartlett-Hayward and chairman of the Black & Decker Mfg. executive committee.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Allied Chem. & Dye	$1.50	Jan. 10	Feb. 1
Amer. Smelt. & Rfg.	40c	Jan. 31	Feb. 28
Amer. Smelt. & Rfg., 1st pf.	$1.75	Jan. 10	Jan. 31
Amer. Smelt. & Rfg., 2nd pf.	$1.50	Jan. 10	Jan. 31
Archer-Daniels-Midland, pf.	$1.75	Jan. 21	Feb. 1
Atlas Pwd., pf.	$1.50	Jan. 20	Feb. 1
Bon Ami, Cl. B, extra	50c	Jan. 18	Jan. 31
Bon Ami, Cl. B	50c	Jan. 18	Jan. 31
Bon Ami, Cl. A	$1.00	Jan. 18	Jan. 31
Colgate-Palmolive-Peet	12½c	Feb. 6	Mar. 1
Colgate-Palmolive-Peet, pf.	$1.50	Mar. 5	Apr. 1
Cons. Chem. Ind., A	37½c	Jan. 15	Feb. 1
Dow Chemical	50c	Feb. 1	Feb. 15
Dow Chemical, pf.	$1.75	Feb. 1	Feb. 15
du Pont, deb.	$1.50	Jan. 10	Jan. 25
Eagle-Picher Lead, pf.	$1.50	Jan. 31	Feb. 1
Freeport Texas	25c	Feb. 14	Mar. 2
Freeport Texas, pf.	$1.50	Apr. 15	May 1
Freeport Texas, pf.	$1.50	Jan. 15	Feb. 3
Gold Dust	30c	Jan. 10	Feb. 1
Hercules Pwd., pf.	$1.75	Feb. 4	Feb. 15
Int'l Nickel, pf.	$1.75	Jan. 2	Feb. 1
Int'l Print. Ink	35c	Jan. 13	Feb. 1
Int'l Print Ink, pf.	$1.50	Jan. 13	Feb. 1
Libbey-Owens-Ford	50c	Feb. 28	Mar. 16
Liq. Carbonic	40c	Jan. 17	Feb. 1
Liq. Carbonic, extra	25c	Jan. 17	Feb. 1
Monsanto, extra	25c	Feb. 25	Mar. 14
Monsanto	25c	Feb. 25	Mar. 14
Nat'l Lead, pf. B	$1.50	Jan. 17	Feb. 1
N. J. Zinc	50c	Jan. 20	Feb. 10
Owens-Illinois	$1.25	Jan. 30	Feb. 15
Parker Rust Proof	$1.12½	Feb. 10	Feb. 20
Phillips Petroleum, extra	25c	Jan. 31	Feb. 29
Phillips Petroleum	25c	Jan. 31	Feb. 29
P. & G.	37½c	Jan. 24	Feb. 15
Solvay Am. Invest., pf.	$1.37½	Jan. 15	Feb. 15

Company Earnings

Annual du Pont report shows earnings applicable to the common stock of $55,676,881, or $5.04 a share on 11,050,399 average shares outstanding. This figure, which includes dividends received from the company's General Motors investment, equivalent to $2.03 on each share of du Pont stock, compares with $40,475,030, or $3.66 a share on 11,049,259 average shares outstanding in '34, which included dividends received from the General Motors investment equivalent to $1.36 on each share of du Pont stock. Figures for both years include du Pont Company's equity in undivided profits or losses of controlled companies not wholly owned. Income account shows net income of $62,085,410, equal to 9.47 times the debenture stock dividend for the year.

Preliminary report of General Motors indicates that the earnings on its common stock for the year '35, including its equity in undivided profits of subsidiary and affiliated companies not consolidated, were $3.69 a share.

Volume of business of the company and its wholly owned subsidiary companies amounted to approximately $220,000,000 for the year '35, an increase, on a comparable basis, of about 19% over '34. Each quarter contributed to this increase, the figures being: First quarter, 14%; 2nd quarter, 5%; 3rd quarter, 29%; 4th quarter, 31%. Increase in tonnage volume accounts for practically the entire increase in dollar volume. Such changes as were made in prices of individual products had the effect of reducing slightly the average price of the company's products.

Approximately $23,400,000 was expended in extending and modernizing the company's manufacturing facilities. About $13,800,000 of this amount provided additional capacity for some of the older processes and for facilities for initial operation of new processes, and approximately $9,600,000 for renewal and modernization of equipment and facilities used in existing processes.

Price Trend of Chemical Company Stocks

	Dec. 31	Jan. 3	Jan. 10	Jan. 17	Jan. 24	Jan. 31	Net gain or loss last month	Price on Jan. 31 1935	1936-35 High	1936-35 Low
Air Reduction	169	172½	187	185¼	186	189	+20	111	194*	104⅜
Allied Chemical	157⅝	159⅞	169½	167½	166	165	+ 7⅜	136	173	125
Columbian Carbon	96½	97	101½	101½	103½	107⅝	+11⅛	69⅝	108*	67
Com. Solvents	21⅝	21	22⅛	21	21⅛	20¾	— ⅞	21⅛	23⅞	16½
du Pont	139½	140	140	145	143½	146¼	+ 6¾	94¾	147*	86⅝
Hercules Powder	87	88	89¼	87	84¼	87⅝	+ ⅝	75¾	90	71
Mathieson	30¼	30½	32	31¼	30⅝	31¼	+ 1	28¼	33⅞	23¾
Monsanto	89	91½	96	95½	95½	95½	+ 6½	56¾	97*	55
Std. of N. J.	51¾	52¼	54⅝	54	54⅞	59⅝	+ 7⅞	41⅜	60¼*	35¾
Texas Gulf S.	33¼	33⅞	35⅛	35	35½	37¼	+ 4	34¼	38⅜*	28¾
Union Carbide	71½	72¼	75⅛	74⅝	74	76	+ 4½	46	76*	44
U. S. I.	43	42⅝	43	43⅛	43	41¼	— 1¾	37†	50⅝	35⅛

* New highs for Jan. † Jan. 30, 1935.

Net income of the Freeport Texas for '35 was $1,492,108 after Federal taxes, depreciation and other charges, according to the preliminary statement. Earnings are equivalent, after allowing for dividends on the 6% preferred, to $1.78 a share on 796,380 common. For the preceding year, company reported a net income of $1,477,089, equal to $1.75 a share on 796,380 shares.

In addition to the announcement of the earnings at the meeting of directors, a dividend of 25c a share on the common was declared. Another dividend of $1.50 on the preferred also was voted.

Report of A. A. C. and subsidiaries for 6 months ended Dec. 31, shows net loss of $97,716 after taxes, depreciation, depletion, reserve for self-insurance, etc., comparing with net loss of $125,232 for the 6 months ended Dec. 31, '34.

For the quarter ended Dec. 31, indicated net profit, based on a comparison of company's reports for 1st quarter of company's fiscal year and the 6 months period, was $11,884 after taxes and charges, equivalent to 5c a share on 222,235 no-par shares of capital stock, excluding shares held in treasury. This compares with net loss of $109,600 in preceding quarter and net loss of $22,776 in December quarter of previous year.

Although sales of explosives declined in '35, 2 leading American companies in that field, Hercules Powder and Atlas Powder, report increases in total sales over '34. This was due to broader markets in various chemical products. Net income gains for '35 are shown by both companies.

Hercules Powder earned $4.23 a common share after all charges against $3.94 in '34. Atlas Powder had a net of $2.81 a common share against $2.49 the year before.

Sales of explosives amounted to 75% of Atlas Powder's total business last year. The percentage was not revealed by Hercules Powder.

"The year was one of further recovery in your company's business as a whole," stated R. H. Dunham, president of Hercules Powder, in his report to stockholders. "Volume averaged approximately 11% greater than in '34, with improvement particularly marked in the latter part of the year. All departments except explosives contributed to this increase. The explosives business showed a decline because of reduced activity in several consuming fields, notably anthracite mining and construction work of the type requiring explosives. However, there are some evidences of impending improvement in this branch of your company's business."

Report of Atlas Powder for year ended Dec. 31, shows net income of $1,161,170 after depreciation and federal taxes, equivalent after dividend requirements on 6% preferred stock, to $2.81 a share on 249,966 no-par shares of common, excluding 11,472 shares held by the company. This compares with $1,124,722 or $2.49 a common share in '34.

S-W To Refund

Sherwin, Williams will refund its present 6% preferred with a 5% issue, but will not enlist the aid of underwriters or a banking firm; it plans to complete the deal within its own organization.

Preferred Accumulations

Accumulations on some chemical preferred stocks continued to mount last year: International Agricultural 7%, $56.00; V.-C., 7%, $20.00; V.-C., 6%, $46.00.

Fansteel's Financing

Fansteel Metallurgical stockholders authorize selling 20,000 shares of common accompanied by a like number of stock purchase warrants of which half will be acquired by Hallgarten & Co. and the balance by International Mining Corp. Action was also taken to reduce preferred stock dividend rate from $7 to $5 and to make such dividends non-cumulative. Directors have declared a dividend on the preferred of $5 per share payable during '36 in quarterly instalments of $1.25 each.

Nitrate Plan Announced

A plan for readjustment of the financial structure of Anglo Chilean Nitrate has been formulated by the company after extended negotiations with a committee in London, representing holders of £2,979,178 sterling 7% debentures and a protective committee for the company's $12,700,000 7% bonds listed on the N. Y. Stock Exchange.

An amended trust deed was executed last November between the company and the first mortgage bonds which extends maturity of this issue of £2,979,178 bonds to Jan. 1, 1961, reduces interest to 4½%, and reduces the sinking fund from 5% minimum to one-half of 1% plus 50% of the earnings in excess of the 4½% interest and ½% sinking fund. All interest and sinking fund payments on the 1st mortgage bonds were placed on an income basis and arrears of interest and sinking fund waived.

Plan for the American issue provides that the bonds be exchanged for new debentures due 1967. Earnings available for the new debenture bonds after servicing the 1st mortgage bonds are to be allocated 80% to interest and 20% to sinking fund. If earnings available for the new debentures should be less than 2% a year, entire amount up to 2% shall be allocated to interest. As long as the company's 1st mortgage bonds remain outstanding, interest on the new debentures shall not exceed 4½% a year, but after the 1st mortgage bonds are retired, interest on the new debentures shall not exceed 5%. Any earnings in excess of 4½% or 5%, as the case may be, will be employed for additional sinking fund on the new debentures.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1935	Net income 1934	Common share earnings 1935	Common share earnings 1934	Surplus after dividends 1935	Surplus after dividends 1934
Am. Agricultural Chemical:							
**December 31 quarter	$3.00	$11,884	†$22,776	$.05	....	......	......
Six months, December 31 ..	3.00	†97,716	†125,232	....	....	......	......
Atlas Powder:							
Year, December 31	2.00	1,161,170	1,124,722	2.81	$2.49	$203,352	$124,331
Canadian Industrial Alcohol:							
Year, September 30	f....	227,937	†558,529	.20	....	......	......
Catalin Corp. of Amer.:							
Year, December 31	f....	254,428	224,874	.47	.42	......	......
Devoe & Raynolds:							
Year, December 31	§1.00	530,063	459,513	c2.88	c2.36	119,500	51,697
Freeport Texas:							
n Year, December 31	1.00	1,492,108	1,477,089	h1.78	j1.76	......	......
Hercules Powder:							
Year, December 31	§3.00	3,175,973	3,038,406	j4.23	j3.94	426,149	257,701
Industrial Rayon:							
Year, December 31	1.68	608,012	1,340,121	1.00	2.23	d399,988	334,121
Lindsay, Light & Chemical:							
n Year, December 31	w.10	51,957	44,674	.63	.50	......	......
Procter & Gamble:							
December 31 quarter	1.50	4,278,858	3,458,561	.64	.50	*......	*......
‡‡Six months, December 31	1.50	7,883,363	7,544,022	1.17	1.11	*......	*......

* Not available. † Net loss. § Plus extras. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and 6 months' period. ‡‡ Indicated earnings as compiled from company's quarterly reports. *c* On combined Cl. A and Cl. B shares. *d* Deficit. *f* No common dividend. *h* On shares outstanding at close of respective periods. *j* On average shares. *w* Last dividend declared, period not announced by company.

Annual Reports for Last Year

Company:	Fixed chgs. times earn.	Pfd. div. times earned	Cash and mark. securities	Inventories	Ratio cur. assets to cur. liab.	Working capital
Atlas Powder:						
Year, Dec. 31, 1935	No. fd. dbt.	2.53	$4,373,856	$2,524,708	10.8	$8,109,835
Year, Dec. 31, 1934	No. fd. dbt.	2.23	5,412,553	2,677,327	13.7	9,271,466
Hercules Powder:						
Year, Dec. 31, 1935	No. fd. dbt.	4.49	¶6,960,585	6,162,352	10.1	14,611,268
Year, Dec. 31, 1934	No. fd. dbt.	4.11	¶6,994,333	7,255,129	13.9	16,321,205

¶ Securities carried at cost.

Chemical Stocks and Bonds

1936 January Last	1936 January High	1936 January Low	1935 High	1935 Low	1934 High	1934 Low	Sales: Number of shares Jan. 1936	Sales: Number of shares 1935	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1934	Earnings $-per share-$ 1933
NEW YORK STOCK EXCHANGE														
189	194	168½	173	104⅜	113	91¾	10,500	153,300	Air Reduction	No	841,288	$5.50	4.98	3.79
165	170¾	157	173	125	160¾	115⅛	26,400	260,600	Allied Chem. & Dye	No	2,214,099	6.00	6.83	5.50
120⅝	124	120⅝	129	122½	130	122⅛	21,700	24,400	7% cum. pfd.	100	345,540	7.00	50.79	42.24
56¼	57¾	52	57¾	41½	48	25¼	15,500	150,400	Amer. Agric. Chem.	100	315,701	2.00	6.37	*p*4.19
28	30⅝	27	35¾	22½	62½	20¾	31,300	438,500	Amer. Com. Alcohol	20	260,716	None	3.57	4.56
45	50	45	52	36	39⅛	26¼	16,100	131,800	Archer-Dan-Midland	No	541,546	1.50	*p*4.21	*p*3.82
59	59	48	48½	32¾	55½	35¼	8,100	107,600	Atlas Powder Co.	No	234,235	2.00	2.49	.74
115½	115½	112	115	106¾	106¾	83	410	6,780	6% cum. pfd.	100	88,781	6.00	13.54	8.38
29	32¼	28⅛	35⅜	19½	44⅞	17⅛	205,600	1,283,400	Celanese Corp. Amer.	No	987,800	None	1.25	3.32
18¾	20½	18⅜	21	15⅛	18⅛	9⅜	53,200	621,800	Colgate-Palm.-Peet	No	1,985,812	.75	1.16	— .57
105½	105½	104½	107¼	101	102½	68½	900	23,900	6% pfd.	100	254,500	6.00	15.14	1.51
107⅝	108⅛	94	101¼	67	77¼	58	13,600	217,200	Columbian Carbon	No	538,154	3.40	3.93	2.17
20¾	22⅞	20⅜	23⅞	16½	36¾	15¾	259,500	2,193,800	Commer. Solvents	No	2,635,371	.85	.89	.88
70¾	73⅜	68½	78⅜	60	84½	55½	44,600	448,400	Corn Products	25	2,530,000	3.00	3.16	3.87
165	165	162	165	148¼	150½	135	900	11,800	7% cum. pfd.	100	243,739	7.00	39.65	46.02
48	49½	42	50⅜	35½	55¼	29	7,100	36,300	Devoe & Rayn. A	No	95,000	2.00	2.36	3.82
146¼	148½	138	146½	86⅝	103⅞	80	39,100	938,250	DuPont de Nemours	20	10,871,997	3.45	3.63	2.93
130½	132	129⅞	132	126⅞	128½	115	1,200	39,600	6% cum. deb.	100	1,092,699	6.00	42.73	35.58
157¾	163½	156½	172¼	110½	116½	79	10,300	229,300	Eastman Kodak	No	2,250,921	5.75	6.28	4.76
160	165	158	164	141	147	120	100	6,040	6% cum. pfd.	100	61,657	6.00	235.22	180.34
34¼	35	28½	30⅝	17¼	50⅜	21½	91,900	347,450	Freeport Texas	10	784,664	1.00	1.76	3.01
130	132	127½	125	112½	160⅛	113½	140	1,990	6% conv. pfd.	100	25,000	6.00	120.08	156.73
50¼	55¼	48	49½	23⅜	28⅜	15⅝	42,700	488,600	Glidden Co.	No	603,304	2.00	*x* 2.91	*x* 1.68
112	114½	107	111	104⅞	107½	83	1,150	10,780	Glidden, 7% pfd.	100	63,044	7.00	*x*40.70	*x*23.57
123	125	120	119½	85	96⅞	74	4,000	58,600	Hazel Atlas	25	434,409	5.00	5.21	6.22
87⅝	89½	84	90	71	81⅝	59	23,800	65,200	Hercules Powder	No	582,679	3.50	3.94	2.79
128	131	128	131	122	125¾	111	790	7,910	7% cum. pfd.	100	105,765	7.00	28.79	22.38
29	31½	28½	36⅜	23½	32	19⅜	35,900	604,000	Industrial Rayon	No	600,000	1.68	2.23	3.01
4⅝	5¼	3¾	5	2⅝	6⅛	2	39,700	183,700	Intern. Agricul.	No	436,049	None	*p*—.99	*p* .69
37¼	39	34	42¾	26	37¼	15	8,200	67,000	7% cum. pr. pfd.	100	100,000	None	*p*2.69	*p*4.00
49½	50	44⅛	47¼	22¼	29¼	21	304,300	2,828,600	Intern. Nickel	No	14,584,025	1.00	1.14	.53
28	28⅞	26¼	36¼	25	32	21	3,700	38,300	Intern. Salt	No	240,000	1.50	2.02	2.04
33¾	36¾	33½	36¼	31	33⅛	15¾	2,700	66,700	Kellogg (Spencer)	No	500,000	1.60	*v*2.22	*v*3.01
50½	51	47¼	49¼	21½	43⅞	22½	93,500	918,500	Libbey Owens Ford	No	2,559,042	1.20	1.25	1.64
38½	41½	37⅝	37¼	24½	35⅜	16⅛	33,200	277,400	Liquid Carbonic	No	342,406	1.25	*v*2.58	*v*1.05
31¼	32¾	30	33⅞	23¾	40¾	23½	34,500	313,200	Mathieson Alkali	No	650,436	1.50	1.20	1.70
95½	97	89¼	94¾	55	61⅝	39	16,200	230,300	Monsanto Chem.	10	864,000	1.25	3.03	2.57
228½	230	204	206	145	170	135	3,000	21,900	National Lead	100	309,831	5.00	8.38	6.98
160	162½	150	162½	150	146½	122	100	6,400	7% cum. "A" pfd.	100	243,676	7.00	20.12	18.35
140	140	137¾	140½	121⅝	121½	100½	440	4,170	6% cum. "B" pfd.	100	103,277	6.00	35.36	30.45
12½	13½	9⅞	10⅞	4⅜	13	5½	95,000	451,100	Newport Industries	1	519,347	None	.31	.05
145½	146⅜	128	129	80	94	60	25,200	223,000	Owens-Illinois Glass	25	1,200,000	4.00	5.41	4.86
47½	49	46⅝	53¾	42⅜	44⅜	33⅛	26,900	369,200	Procter & Gamble	No	6,410,000	1.70	*p* 2.23	*p* 2.11
120¼	121	119	121	115	117	102½	520	8,330	5% pfd. (ser. 2-1-29)	100	171,569	5.00	*p*88.13	*p*83.69
8¾	9⅛	7½	8¾	4	6¾	3⅛	51,000	323,800	Tenn. Corp.	5	857,896	None	.27	— .11
37¼	38⅜	33	36¾	28¾	43¼	30	92,000	629,800	Texas Gulf Sulphur	No	2,540,000	2.00	1.81	2.93
76	76⅝	71⅝	75¾	44	50⅞	35⅞	81,200	1,259,500	Union Carbide & Carbon	No	9,000,743	2.00	2.28	1.59
71½	73¼	68	78	46	50⅜	35	9,000	237,300	United Carbon	No	370,127	2.40	3.55	1.39
41½	44⅜	39¾	50⅝	35⅛	64¾	32	25,900	402,400	U. S. Indus. Alco.	No	391,033	2.00	4.04	3.56
24⅛	24⅝	20¼	21¾	11¼	31¾	14	101,800	491,800	Vanadium Corp.-Amer.	No	366,637	None	—2.29	—2.40
5⅛	5¼	4⅛	4⅝	2½	5⅜	1⅞	17,100	186,400	Virginia-Caro. Chem.	No	486,000	None	*p*—.79	*p*—2.46
35	36¼	32	35¾	17½	26	10	31,200	328,900	6% cum. part. pfd.	100	213,392	None	*p*4.20	*p* .52
.....	.....	.....	120½	85	84	59¾	1,600	12,500	7% cum. prior pfd.	100	60,000	8.00	*p*23.50	*p*9.06
26¼	28½	23	25½	16¾	27¼	14⅞	27,600	122,400	Westvaco Chlorine	No	284,962	.40	1.55	1.08
NEW YORK CURB EXCHANGE														
34⅛	35¾	29¼	30	15	22½	14⅝	92,500	890,400	Amer. Cyanamid "B"	No	2,404,194	.60	.99	.99
3½	3¾	3½	4	2	4⅛	2⅜	2,100	15,400	British Celanese Am. R.	10	2,806,000	None	.....	.....
114½	116¼	110	115	90	105¼	81	1,550	24,900	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	16.37	32.24
115¾	116	112	111¼	97½	102	83	675	11,175	7% cum. prior pfd.	100	213,668	7.00	28.13	47.98
10	15	7	15	7	19	7	1,975	15,800	Celluloid Corp.	15	194,952	None	—1.67	—1.00
14⅛	14½	11⅝	14½	11⅝	14⅜	10½	1,100	10,300	Courtaulds' Ltd.	1 £	24,000,000	7½%	7.57%	8.98%
97½	97½	95⅛	105½	80½	91	67½	5,900	83,200	Dow Chemical	No	945,000	2.00	3.32	†3.60
9	10¾	8½	12½	6¼	10¾	4	7,300	117,800	Duval Texas Sulphur	No	500,000	None	*z* .25	*z* .08
52½	55	51½	58	37	40¾	19	1,200	21,000	Heyden Chem. Corp.	10	147,600	1.50	3.07	2.74
109	109½	98¼	97¼	46¾	57½	39	9,440	86,790	Pittsburgh Plate Glass	25	2,141,305	2.90	2.69	1.87
127⅜	130	118½	128⅞	84	90½	47¼	11,000	114,000	Sherwin Williams	25	635,583	4.00	*y*6.19	*y*5.31
110	110	107¾	113½	106	109¾	100	2,270	7,890	6% pfd. AA. cum.	100	155,521	6.00	*y*33.17	*y*28.44
PHILADELPHIA STOCK EXCHANGE														
116¾	116¾	110	116¾	76½	75	50¼	320	6,769	Pennsylvania Salt	50	150,000	4.00	*p*6.82	*p*4.10

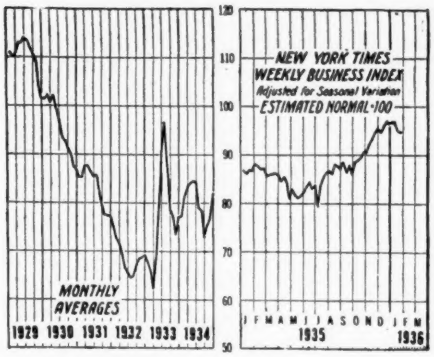
1936 January Last	1936 January High	1936 January Low	1935 High	1935 Low	1934 High	1934 Low	Sales Jan. 1936	Sales 1935	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
114½	115¼	112½	116	104½	106¾	83⅞	531,000	5,745,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
28	30⅜	26	29¾	7⅜	17¾	5	507,000	3,615,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
96	98½	92½	94½	77⅜	88	61½	120,000	802,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
99	100½	99	100¼	91⅛	92	62	107,000	1,767,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
26½	27¼	21	21½	7	19½	5⅛	2,948,000	14,168,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
70¾	76	66½	94	65	98½	89⅞	36,000	1,018,000	Montecatini Min & Agric. det. 7's with war.	1937	7	J. J.	7,075,045
.....	.....	.....	38	32⅛	74½	34½	......	56,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
105	105	103⅞	104	91½	90	65½	24,000	628,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
92	93	87	94¼	66	89½	62	34,000	2,144,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000

† Years ended 5-31-34 and 35; *p* Years ended 9-30-34 and 35; *v* Years ended 8-1-34 and 35; *y* Years ended 8-31-34 and 35; *z* Years ended 8-31-34 and 35; * Including extras; *x* Years ended 10-31-34 and 35.

Industrial Trends

¶ *January Business Adversely Affected by Political Uncertainties*

Retail merchants and wholesalers reported that January business was somewhat below their earlier estimates, but



were generally in agreement that the severe cold spell affecting most of the country was directly responsible. Total January volume was considerably above the figure for the same month last year.

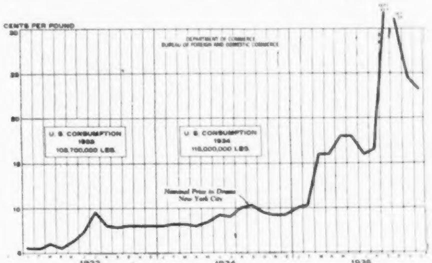
So-called heavy industries are fairly active. Steel operations continue close to 50% and an early Spring spurt is momentarily expected. Some slowness is reported by the paper, textile, paint, leather, rubber and glass industries in moving into Spring production schedules. The sudden ending of AAA and other alphabetical agencies is blamed in part for this condition but it is thought to be only temporary and that the balance of the 1st quarter will see the greatest industrial activity in the past 6 years. January motor production of 225,000 units was disappointing because the industry had expected a production of over 300,000. The adoption of the Soldiers' Bonus Bill should offset any loss of sales to the farmers because of the voiding of the AAA. Some decline was, of course, expected, because of the earlier introduction of new models this season.

Carloadings and electrical consumption figures showed heavy advances over the corresponding weeks of last year, but declines in other important factors caused a decline in the *N. Y. Times'* Index of Business Activity. Prices in the raw materials markets were adversely affected by the AAA ruling of the Supreme Court.

With the legislative situation somewhat cleared, however, leading industrialists appear bullish on business during the 1st quarter of the year.

AAA End Drives Raw Materials Lower

Many of the oils were adversely affected by the Supreme Court's decision which brought to an end the AAA. Volume of purchasing was noticeably lower. Chinawood, after several weeks of weakness, has turned firmer but both offerings and sales were in exceptionally light



Price trend of tung oil.

volume. Cottonseed was definitely lower and the prevailing sentiment at the moment is decidedly a pessimistic one. Granting of an injunction on the 3c coconut processing tax has thrown a veil of uncertainty over this market also and buyers are remaining aloof for the time being. Most of the animal oils and fats closed out the month lower.

A bullish note is developing in linseed. Argentine supply and quality of flaxseed is reported below normal and a sizable increase in oil consumption over the next half year is confidently expected. In some quarters a rise in cottonseed is looked for over the next 3 months but with a larger cotton acreage almost a certainty this season, there should be an increase in stocks of oil available in the last half of '36.

Call for waxes was fair in January. Beeswax prices were generally firmer but Carnauba quotations were under those prevailing at the close of last year. Quite a little heavy purchasing developed after the price reductions were made known.

Bone dry shellac was advanced 1c but garnet, superfine and T. N. were quoted at 1c under the figures which prevailed on Dec. 31st. Movement against contracts was in fair volume but there was little spot business placed in the 4-weeks period, according to leading factors.

Statistics of Business

	December 1935	December 1934	November 1935	November 1934	October 1935	October 1934
Automotive production	......	183,187	295,927	76,353	206,612	132,488
Bldg. contracts*‡	$264,136	$92,685	$188,155	$111,692	$200,596	$135,225
Failures, Dun & Bradstreet	940	963	927	923	1,097	1,091
Merchandise imports‡	$186,648	$132,258	$168,955	$150,919	$189,240	$129,635
Merchandise exports‡	$223,737	$170,654	$269,400	$194,712	$221,215	$206,413
Newsprint Production						
Canada, tons	244,732	239,544	262,854	240,869	265,515	235,021
U. S., tons	75,869	79,777	78,929	74,933	79,746	80,572
Newfoundland, tons	26,833	24,394	28,567	28,713	29,744	25,321
Mexico, tons	696	1,820	2,045	1,756	1,942	1,953
Total, tons	348,130	345,535	372,395	346,271	377,947	342,867
Plate glass prod., sq. ft. ...	......	......	15,909,262	6,587,366	16,592,803	7,512,052
Steel ingots production	3,081,807	1,964,257	3,153,247	1,610,625	3,146,446	1,481,902
Steel activity, % capacity..	55.68	35.68	54.78	27.76	52.64	24.59
Pig iron production, tons ..	2,106,000	1,027,000	2,065,913	956,940	1,978,411	951,062
U. S. consumption, crude rubber, tons	......	......	......	......	42,436	31,253
Tire shipments	......	......	3,989,877	3,191,102	4,095,488	2,912,000
Tire production	......	......	3,997,025	3,340,859	4,050,509	3,182,000
Tire inventory	......	......	8,249,220	8,778,989	8,290,594	8,444,000
Dept. of Labor Indices†						
Factory payrolls, totals†..	76.6	63.2	74.5	59.5	75.0	60.7
Factory employment† ...	84.6	78.1	84.9	76.9	85.2	78.6
Chemical price index† ...	......	78.2	......	80.9	......	81.1
Chemical employment†*a* ..	111.4	108.3	112.9	108.6	113.1	109.4
Chemical payrolls†*a*	99.9	89.9	99.2	90.9	100.6	91.6
Chemicals and Related Products						
Exports‡	$8,873	$8,478	$10,463	......	$3,959	$7,793
Imports‡	$6,482	$4,437	$6,685	......	$5,010	$4,955
Stocks, mfd. goods†	......	......	118	114	117	121
Stocks, raw materials† ..	......	......	111	121	115	120
Cement prod., ratio of prod. to capacity	25.6	19.5	32.2	26.2	33.1	29.3
Anthracite prod., tons	*y*4,620,000	4,687,000	2,868,490	3,600,652	3,681,252	4,729,000
Bituminous prod., tons ..	*y*34,829,000	32,526,000	*y*33,010,000	30,856,000	*y*36,697,000	32,807,000

Week Ending	Carloadings 1936	Carloadings 1935	Carloadings % of Change	Electrical Output§ 1936	Electrical Output§ 1935	Electrical Output§ % of Change	Jour. of Com. Price Index	National Fertilizer Assoc. Indices Chem. & Drugs	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Dec. 28......	466,679	425,404	+ 9.7	1,847,264	1,650,467	+11.9	81.3	94.8	64.4	70.7	77.9	80.0	46.7	....	118.9
Jan. 4......	541,984	497,274	+ 9.0	1,854,874	1,668,731	+11.2	81.7	95.0	64.4	70.7	78.5	80.1	49.2	....	119.0
Jan. 11......	615,028	553,518	+11.0	1,970,578	1,772,609	+11.2	80.0	95.0	64.4	70.7	78.3	80.2	49.4	96.7	118.5
Jan. 18......	611,408	562,826	+ 8.6	1,949,676	1,778,273	+ 9.6	78.9	95.0	64.4	71.9	77.5	80.3	49.9	94.9	119.3
Jan. 25......	584,691	555,528	+ 5.2	1,955,507	1,781,666	+ 9.8	79.9	94.9	64.3	71.9	78.0	80.6	49.4	....	119.2
Feb. 1......	......	......	.....	....	....	.....	79.9	....	....	....	....	....	....	....	119.0

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; *y* Preliminary.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1935 Average $1.21 - Jan. 1935 $1.23 - Jan. 1936 $1.19

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Acetaldehyde, drs, c-l, wgs lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks ...lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs..lb.	.38	.43	.38	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys ...lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs ...lb.	.22	.24	.22	.24	.22	.24
Acetone, tks, delv ...lb.	.11	.12	.11	.12	.11	.12
drs, c-l, delv ...lb.	...	.12	...	.12	...	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls ...lb.	.06¾	.07	.06¾	.07	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks ...100 lbs.	...	2.45	...	2.45	2.40	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.43	...	8.43	8.25	8.43
glacial, USP, bbls, c-l, wks ...100 lbs.	...	12.43	...	12.43	12.25	12.43
Adipic, kgs, bbls ...lb.	...	.72	...	.72	...	.72
Anthranilic, refd, bbls ...lb.	.85	.95	.85	.95	.85	.95
tech, bbls ...lb.	...	.75	...	.75	...	.75
Battery, cbys, delv ...100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs ..lb.	.40	.45	.40	.45	.40	.45
USP, 100 lb kgs ...lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ...ton a	...	95.00	...	95.00	80.00	95.00
Broenner's, bbls ...lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys ...lb.	.53	.60	.53	.60	.53	.60
edible, c-l, wks, cbys ...lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs ...lb.	...	.22	...	.22	...	.22
wks ...lb.	...	.23	...	.23	...	.23
tks, wks ...lb.	...	.21	...	.21	...	.21
Camphoric, drs ...lb.	...	5.25	...	5.25	...	5.25
Chicago, bbls ...lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks ...lb.	.03½	.05	.03½	.05	.03½	.05½
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.13¾	.16¾
Citric, USP, crys, 230 lb bbls ...lb. b	.28	.29	.28	.29	.28	.29
anhyd, gran, drs ...lb. b	...	.31	...	.31	...	.31
Cleve's, 250 lb bbls ...lb.	.52	.54	.52	.54	.52	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal ..gal.	.51	.53	.51	.53	.46	.53
99%, straw, LB, drs, wks, frt equal ...gal.	.68	.70	.68	.70	.64	.68
resin grade, drs, wks, frt equal ...gal.	.52	.53	.52	.53	.52	.55
Crotonic, drs ...lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs ..lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls ...lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb drs ...lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls ...lb.	.65	.68	.65	.68	.65	.68
USP, bbls ...lb.	.70	.80	.70	.80	.70	.80
Gamma, 225 lb bbls, wks..lb.	.80	.84	.80	.84	.77	.79
H, 225 lb. bbls, wks...lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys ...lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks ...lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks ...lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks ...lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks ...lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb. bbls ...lb.	.04½	.05	.04½	.05	.04½	.05
22%, light refd, bbls ...lb.	.06½	.07	.06½	.07	.06½	.07
44%, light, 500 lb bbls ..lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls ..lb.	.09½	.10	.09½	.10	.09½	.10
50%, water white, 500 lb bbls ...lb.	...	.14½	...	.14½	...	...
USP X, 85%, cbys ...lb.	.45	.50	.45	.50	.45	.50
Laurent's, 250 lb bbls ...lb.	.46	.47	.46	.47	.36	.37
Linoleic, bbls ...lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs ...lb.	.29	.32	.29	.32	.29	.32
Malic, powd, kgs ...lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ...lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks ...N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls ...lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks ...100 lb.	...	1.35	...	1.35	...	1.35
tks, wks ...100 lb.	...	1.00	...	1.00	...	1.00

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Muriatic (cont.):						
20°, cbys, c-l, wks ..100 lb.	...	1.45	...	1.45	...	1.45
tks, wks ...100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks ..100 lb.	...	1.95	...	1.95	...	1.95
tks, wks ...100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys ...lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls ...lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s. v., drs ...lb.	.11	.14	.11	.14	.11	.14
Sludges, drs ...lb.	.06	.10	.06	.10	...	...
Naphthionic, tech, 250 lb bbls ...lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks ...100 lb. c	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks..100 lb. c	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks..100 lb. c	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks..100 lb. c	...	6.50	...	6.50	...	6.50
CP, cbys, delv ...lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. ...lb.	.11½	.12½	.11½	.12½	.11½	.12½
Phosphoric, 50%, USP, cbys ...lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks..lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks..lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks.lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks ...lb.	.30	.40	.30	.40	.30	.40
Propionic, 98% wks, drs..lb.	...	.35	...	.35	...	.35
80% ...lb.	.15	.17½	.15	.17½	.15	.17½
Pyrogallic, crys, kgs, wks..lb.	1.55	1.65	1.55	1.65	1.55	1.65
Salicylic, tech, 125 lb bbls, wks ...lb.	...	.40	...	.40	...	.40
Sebacic, tech, drs, wks ...lb.	...	.58	...	.58	...	.58
Succinic, bbls ...lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.18	.19
Sulfuric, 60°, tks, wks ..ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks ...100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks ...ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks ...100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks ...lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ...ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd, 300 lb bbls ...lb.	...	.24	...	.24	.24	.25
Tobias, 250 lb bbls ...lb.	.70	.72½	.70	.72½	.70	.80
Trichloroacetic bottles ...lb.	2.45	2.75	2.45	2.75	2.45	2.75
kgs ...lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls ...lb.	1.50	1.60	1.50	1.60	1.50	1.60
Vanadic, drs, wks ...lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls ...lb.	.50	.60	.50	.60	.45	.60
dark, bbls ...lb.	.12	.17	.12	.17	.12	.17
egg, edible ...lb.	...	1.05	...	1.05	.85	1.05
vegetable, edible ...lb.	.65	.70	.65	.70	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv ...lb.	...	.143	...	.143	...	...
c-l, drs, delv ...lb.	...	.150	...	.150	...	...
lcl, drs, delv ...lb.	...	.157	...	.157	...	...
Amyl, secondary, tks, delv ...lb.	...	.108	...	.108	...	.108
Benzyl, bottles ...lb.	.65	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, delv lb. d	...	.11	...	.11	.11	.12
c-l, drs, delv ...lb. d	...	.12	...	.12	.12	.13
Butyl, secondary, tks, delv ...lb. d	...	.096	...	.096	...	.096
c-l, drs, delv ...lb. d	...	.106	...	.106	...	.106
Capryl, drs, tech, wks ..lb.	...	.85	...	.85	...	.85
Cinnamic, bottles ...lb.	3.25	3.65	3.25	3.65	3.25	3.65
Denatured, No. 5, c-l, drs, wks ...gal. e	...	.44	...	.44	.34	.49
Western schedule, c-l, wks ...gal. e	...	.52	...	.52	.38	.52
Denatured, No. 1, tks, wks ...gal. e	...	.28	...	.28	.29½	.31
c-l, drs, wks ...gal. e	...	.34	...	.34	.34½	.36
Western schedule, tks, wks ...gal. e	...	.34	...	.34	.32½	.35
c-l, drs, wks ...gal. e	...	.39	...	.39	.37½	.40
Diacetone, tech, tks, delv ...lb. f	...	.16	...	.16	...	.16
c-l, drs, delv ...lb. f	...	.17	...	.17	...	.17

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers are given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Alcohols (continued)						
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.10	...	4.10	4.08½	4.10
c-l, drs gal. *g*	4.17	4.27	4.17	-4.27	4.13½	4.27
c-l, bbls gal. *g*	4.18	4.28	4.18	4.28	4.15½	4.28
absolute, drs gal. *g*	4.57½	6.11½	4.57½	6.11½	4.55½	6.11½
Furfuryl, tech, 500 lb, drs lb.	...	.35	...	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.11½	...	.11½	...	.11½
c-l, drs, delv lb.	...	.12½	...	.12½	...	.12½
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	4.00	4.50	4.00	4.50	4.00	4.50
Isobutyl, refd, lcl, drs lb.	...	.12	...	.12	.12	.60
c-l, drs lb.	...	.11½	...	.11½	...	...
tks lb.	...	.10½	...	.10½	...	...
Isopropyl, refd, c-l, drs lb.	...	.55	...	.55	...	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.32	...	.32	...	...
Western points, tks, wks gal.	...	.35	...	.35	...	...
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls lb.	.60	.65	.60	.65	.60	.65
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	...	3.00	...	3.00	...	3.00
25 bbls or more, wks 100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls, wks 100 lb.	...	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls 100 lb.	7.00	7.25	7.00	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.00
25 bbls or more, bbls, wks 100 lb.	...	3.00	...	3.00	...	3.15
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks 100 lb.	4.00	4.15	4.00	4.15	4.00	4.15
Aluminum metal, c-l, NY 100 lb.	19.00	20.00	19.00	20.00	19.00	23.30
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06½	.07	.06½	.07	.06½	.07
Solution, drs, wks lb.	.03	.03½	.03	.03½	.03	.03½
Hydrate, 96%, light, 90 lb. bbls, delv lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks lb.	.04	.04½	.04	.04½	.04	.04½
Oleate, drs lb.	...	.15¾	...	.15¾	...	.15¾
Palmitate, bbls lb.	.21	.22	.21	.22	.20	.22
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.18	.20	.18	.20	.17	.20
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks 100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.15¼	.21½	.15¼	.21½	.15¼	.21½
26°, 800 lb drs, delv lb.	.02½	.03	.02½	.03	.02½	.03
Aqua 26°, tks, NH cont.	...	.05	...	.05	...	.05
tk wagon lb.	...	.024	...	.024	...	.024
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. plant 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls lb.	.15	.17	.15	.17	.15	.17
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks lb.	5.00	5.75	5.00	5.75	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Linoleate lb.	.11	.12	.11	.12	.11	.12
Nitrate, tech, cks lb.	.04	.05	.04	.05	.04	.05
Oleate, drs lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd, bbls lb.	.26	.27	.26	.27	.26	.27
pure, cryst, bbls, kgs lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs lb.	.22½	.25	.22½	.25	.22½	.25
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.08	.10
Sulfate, dom, f.o.b., bulk ton	22.00	24.00	22.00	24.00	20.00	24.00
200 lb bgs ton	...	nom.	...	nom.	25.50	25.80
100 lb bgs lb.	...	nom.	...	nom.	26.00	26.50
Sulfocyanide, kgs lb.	...	.55	...	.55	...	.50
Amyl Acetate (from pentane) tks, delv lb.	...	.13½	...	.13½	...	.13½
tech, drs, delv lb.	.142	.149	.142	.149	.142	.149
secondary, tks, delv lb.	...	.108	...	.108	...	.108
c-l, drs, delv lb.	.118	.123	.118	.123	.118	.123
Amyl Chloride, norm drs, wks lb.	.56	.68	.56	.68	.56	.68
Chloride, mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	.50	.52	.50	.52	.50	.52
Antimony metal slabs, ton lots lb.	...	.12¾	...	.12¾	.12½	.16
Needle, powd, bbls lb.	.12	.12½	.12	.12½	.09	.13½
Butter of, see Chloride.						
Chloride, soln cbys lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls lb.	.13¾	.14	.13¾	.14	.10¼	.15
Salt, 63% to 65%, tins lb.	.22	.24	.22	.24	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.19	.23
Vermilion, bbls lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Triple, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Arglos, 80%, casks lb.	.14	.15	.14	.15	.15	.16
Crude, 30%, casks lb.	.07	.08	.07	.08	.07	.08
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08¾	.09¾	.08¾	.09¾	.08¾	.09¾
Arsenic, Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03½	.04½	.03½	.04½	.03½	.04½
Metal lb.	.40	.42	.40	.42	.40	.42
Asbestine, c-l, wks ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip, 200 lb bgs, wks ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ton	42.00	45.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY lb.	.15½	.17½	.15½	.17½	.14	.17½
Chloride, 600 lb bbl, wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.05½	.06	.05½	.06	.05½	.06
Nitrate, 700 lb cks lb.	...	.08¼	...	.08¼	...	.08¼
Barytes, floated, 350 lb bbls wks ton	23.65	31.15	23.65	31.15	23.00	31.15
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks ton	...	16.50	...	16.50	16.50	18.00
No. 2 ton	...	11.00	...	11.00	11.00	12.50
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed gal.	...	.18	...	.18	.15	.18
90% c-l, drs gal.	...	.23	...	.23	.23	.24
Ind Pure, tks, frt allowed gal.	...	.18	...	.18	.15	.18
Benzidine Base, dry, 250 lb bbls lb.	.72	.74	.72	.74	.67	.69
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks lb.	.24	.27	.24	.27	...	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.53	.55	.53	.55	.53	.55
Bismuth metal	1.00	1.10	1.00	1.10	.90	1.20
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	2.95	3.00	2.95	3.00	2.95	3.00
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.40	1.45	1.40	1.45	1.55	1.70
Trioxide, powd, boxes lb.	3.45	3.50	3.45	3.50	3.45	3.50
Subnitrate	1.30	1.35	1.30	1.35	1.30	1.45
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	42.50	70.00	42.50	70.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	1.90	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.15	3.60
Blood, dried, f.o.b., NY unit	...	3.10	...	3.10	2.50	3.25
Chicago, high grade unit	...	3.50	...	3.50	2.50	3.75
Imported shipt unit	3.00	3.05	3.00	3.05	2.75	3.30
Blues, Bronze Chinese Milori Prussian Soluble lb.	.37	.38½	.37	.38½	.36½	.38
Ultramarine,* dry, wks, bbls lb.	...	.10	...	.10	...	...
Regular grade, group 1 lb.	...	.15	...	.15	...	...
Special, group 1 lb.	...	.18	...	.18	...	...
Pulp, No. 1 lb.	...	.26	...	.26	...	...
Bone, 4½ + 50% raw, Chicago ton	20.00	22.00	20.00	22.00	19.00	22.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.05½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	23.25	...	23.25	22.75	24.00
Domestic, bgs, Chicago ton	19.00	20.00	19.00	20.00	16.00	21.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	40.00	...	40.00	36.00	40.00
bbls, delv ton *i*	...	50.00	...	50.00	46.00	50.00
c-l, sacks, delv ton *i*	...	44.00	...	44.00	40.00	44.00
c-l, bbls, delv ton *i*	...	54.00	...	54.00	50.00	54.00
Tech, powd, 80 ton lots, sacks ton *i*	...	45.00	...	45.00	41.00	45.00
bbls, delv ton *i*	...	56.00	...	56.00	51.00	56.00
c-l, sacks, delv ton *i*	...	49.00	...	49.00	45.00	49.00
c-l, bbls, delv ton *i*	...	59.00	...	59.00	55.00	59.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases lb.	.08	.16	.08	.16	.08	.16
Jobbers, West, c-l lb.	.08	.10	.08	.10	.08	.10
Dealers, East, c-l lb.	.08½	.16½	.08½	.16½	.08½	.16½
Dealers, West, c-l lb.	.09	.11	.09	.11	.09	.11

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

Prices

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Bromine, cases lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks lb.	...	.04	...	.04	...	.04
Butyl, Acetate, norm drs, frt allowed lb.	.12	.12½	.12	.12½	.12	.13½
tks, frt allowed lb.	...	.11	...	.11	.11	.13
Secondary, tks, frt allowed lb.	...	.096	...	.096	...	.096
drs, frt, allowed lb.	.106	.111	.106	.111	.106	.111
Aldehyde, 50 gal drs, wks lb.	.19	.21	.19	.21	.19	.21
Secondary, drs lb.	.60	.75	.60	.75	.60	.75
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate, drs lb.	.22½	.23½	.22½	.23½	.22½	.23½
Propionate, drs lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs lb.	...	.26	...	.26	...	.26
Tartrate, drs lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes lb.	1.00	1.10	1.00	1.10	.75	.85
Cadmium Metal lb.	.85	.90	.85	.90	.55	.90
Calcium, Acetate, 150 lb bgs c-l, delv 100 lb.	...	2.10	...	2.10	2.00	2.10
Arsenate, jobbers, East of Rocky Mts, drs lb.	.06	.06⅜	.06	.06⅜	.06	.06½
dealers, drs lb.	.06¼	.07¾	.06¼	.07¾	.06¼	.07¾
South, jobbers, drs lb.	.06	.06½	.06	.06½	.06	.06½
dealers, drs lb.	.06½	.06¾	.06½	.06¾	.06¼	.06¾
Carbide, drs lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, wks ton	...	19.50	...	19.50	...	19.50
Solid, 650 lb drs, c-l, f.o.b. wks ton	...	17.50	...	17.50	...	17.50
Ferrocyanide, 350 lb bbls wks lb.	...	.17	...	.17	...	.17
Gluconate, tech, 125 lb bbls lb.	...	.28	...	.28	...	.28
Nitrate, 100 lb bgs ton	...	26.50	...	26.50	...	26.50
Palmitate, bbls lb.	.21	.22	.21	.22	.20	.22
Peroxide, 100 lb drs lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip, bbls lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls lb.	.18	.20	.18	.20	.17	.20
Camphor, slabs lb.	.55	.56	.55	.56	.49	.57
Powder lb.	.55	.56	.55	.56	.50	.57
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l lb.	.08	.15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv lb.	...	.08¼	...	.08¼	...	.08¼
Bisulfide, 500 lb drs lb.	.05¼	.08	.05¼	.08	.05¼	.08
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.15	.16¾	.15	.16¾	.09½	.16¾
80-100 mesh, c-l, bgs lb.	.15½	.17¼	.15½	.17¼	.10	.17¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ton	...	15.50	...	15.50	16.00	18.50
Imported, ship, bgs ton	...	17.50	...	17.50	17.25	20.00
Celluloid, Scraps, ivory cs lb.	.17	.18	.17	.18	.17	.18
Transparent, cs lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs lb.	.55	.60	.55	.60	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks bu.	...	.15	...	.15	...	.15
Willow, powd, 100 lb bbl, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
bgs, delv* ton	24.40	25.40	24.40	25.40	22.40	30.00
Chestnut, clarified bbls, wks lb.	...	.01⅞	...	.01⅞	...	.01⅞
25%, tks, wks lb.	...	.01½	...	.01½	...	.01½
Pwd, 60%, 100 lb bgs. wks lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	...	7.00
Powdered, bbls lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls, wks ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract lb. *j*	...	.05½	...	.05½	...	.05½
Liq. tk, wks, contract 100 lb.	...	2.15	...	2.15	2.00	2.15
Multi, c-l, cyls, wks, cont lb.	2.30	2.55	2.30	2.55	2.30	2.40
Chloroacetophenone, tins, wks lb.	...	2.00	...	2.00	...	2.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls lb.	.85	.90	.85	.90	.85	.90
Chrome, Green, CP lb.	.17	.18½	.17	.18½	.17	.30
Yellow lb.	.11	.12	.11	.12	.11	.16
Chromium, Acetate, 8% Chrome, bbls lb.	.06	.08	.06	.08	.05	.05¾
20° soln, 400 lb bbls lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

Current

Coal Tar
Diphenylguanidine

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Coal tar, bbls ....bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls ......lb.	...	.60	...	.60	...	.60
Carbonate tech, bbls ....lb.	1.35	1.40	1.35	1.40	1.35	1.40
Hydrate, bbls ....lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls ...lb.	...	.30	...	.30	...	.30
Resinate, fused, bbls ...lb.	...	.12½	...	.12½	...	.12½
Precipitated, bbls ......lb.	...	.32	...	.32	...	.32
Cobalt Oxide, black, bgs ..lb.	1.39	1.49	1.39	1.49	1.25	1.49
Cochineal, gray or bk bgs..lb.	.32	.36	.32	.36	.32	.39
Teneriffe silver, bgs ....lb.	.33	.37	.33	.37	.33	.40
Copper, metal, electrol 100 lb.	...	9.50	...	9.50	8.00	9.25
Carbonate, 400 lb bbls ..lb.	...	.08¼	...	.08¼	...	.08¼
52-54% bbls ....lb.	.14½	.16¼	.14½	.16¼	.14½	.16¼
Chloride, 250 lb bbls ... lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls .... lb.	...	.20	...	.20	...	.20
Oxide, red, 100 lb bbls..lb.	.14	.15	.14	.15	.15	.17
black bbls, wks ......lb.	.14½	.15	.14½	.15	.14	.16½
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls .. lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	3.85	...	3.85	...	3.85
Copperas, crys and sugar bulk c-l, wks, bgs ....ton	13.00	14.00	13.00	14.00	12.00	14.00
Corn Syrup, 42 deg, bbls ....100 lb.	...	3.05	...	3.05	3.18	3.63
43 deg, bbls .....100 lb.	...	3.10	...	3.10	3.23	3.68
Corn Sugar, tanners, bbls ....100 lb.	...	3.08	...	3.08	3.46	3.66
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	...	.16¾	...	.16¾	.16¼	.17¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ......gal.	.12½	.13½	.12½	.13½	.11½	.13½
Grade 2 ....gal.	.109	.12	.109	.12	.10½	.12
Cresol, USP, drs ....lb.	.10	.10½	.10	.10½	.10	.11½
Crotonaldehyde, 98%, 50 gal drs ....lb.	.26	.30	.26	.30	.32	.36
Cudbear, English .. ..lb.	.19	.25	.19	.25	.19	.25
Cutch, Philippine, 100 lb bale ....lb.	.04	.04¾	.04	.04¾	.03½	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.07½	...	1.07½	...	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	3.45	3.65	3.45	3.65	3.60	4.15
British Gum, bgs ...100 lb.	3.70	4,00	3.70	4.00	3.85	4.50
White, 140 lb bgs ..100 lb.	3.40	3.60	3.40	3.60	3.50	4.10
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl ...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.08	...	.08	.08	.08¾
Diamylamine, drs, wks ...lb.	...	1.00	...	1.00	...	1.00
Diamylene, drs, wks ......lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Diamylphthalate, drs wks gal.	.18	.19½	.18	.19½	.18	.20½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls ....lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutylphthalate, drs, wks lb.	.20	.21	.20	.21	.20	.23
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	.15	.23
Dichloropentanes, drs, wks lb.	.032	.040	.032	.040	.032	.040
tks, wks ....lb.	...	.02½	...	.02½	...	.02½
Diethanolamine, tks ......lb.	...	.30	...	.30	...	...
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs ....lb.	...	.25	...	.25	...	.25
Diethylaniline, 850 lb drs..lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs ....lb.	.18½	.19	.18½	.19	.18½	.27
Diethylsulfate, tech, 50 gal drs ....lb.	...	...	...	...	...	...
Diethyleneglycol, drs .... lb.	.15½	.17½	.15½	.17½	.15½	.17½
Mono ethyl ethers, drs..lb.	.15	.17	.15	.17	.15	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.27
Diglycol Oleate, bbls .... lb.	...	.24	...	.24	.16	.24
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	.95	...	.95	...	.95
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.29	.30
Dimethyl Ethyl Carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs ...lb.	.20	.21½	.20	.21½	.20½	.24½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls ....lb. *k*	.17	.19½	.17	.19½	.17	.19½
Dinitrochlorobenzene, 400 lb bbls .... lb.	.14	.15½	.14	.15½	.14	.15½
Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.15½	.16½	.15½	.16½	.15½	.16½
Diphenyl ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb bbl ....lb.	.35	.37	.35	.37	.36	.37

k Higher price is for purified material.

Prices

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	34.00	36.00	34.00	36.00	36.00	40.00
Extract ....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, dom., 200 lb cases						
..................lb.	...	.63	...	.63	.46	.63
Imported ....lb.	.54	.56	.54	.56	...	...
Epsom Salt, tech, 300 lb bbls						
c-l NY ....100 lb.	1.80	2.00	1.80	2.00	1.80	2.25
USP, c-l, bbls .....100 lb.	...	2.00	...	2.00	2.00	2.25
Ether, USP anaesthesia 55 lb						
drs ....lb.	.22	.23	.22	.23	.22	.23
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ......lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks ....lb.	.07½	.08	.07½	.08	.07½	.08
drs ....lb.	.08½	.09	.08½	.09	.08½	.09
Anhydrous, tks ....lb.	...	.08½	...	.08½	...	.08¼
drs ....lb.	.09½	.10	.09½	.10	.09½	.10
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys ...lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs						
..................lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks ......lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs,						
frt allowed ....lb.	.08½	.09	.08½	.09	.08½	.09
tks, frt allowed ......lb.	...	.07½	...	.07½	...	.07½
Oxalate, drs, wks ......lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs,						
wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb						
drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal						
cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	...
Dichloride, 50 gal drs ..lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.28
tks, wks ....lb.	...	.16	...	.16	...	...
Mono Butyl Ether, drs.						
wks ....lb.	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs,						
wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks ......lb.	.17½	.18½	.17½	.18½	.17½	.18½
tks, wks ....lb.	...	.16½	...	.16½	...	.16½
Mono, Methyl Ether, drs						
wks ....lb.	.19	.23	.19	.23	.19	.23
tks, wks ....lb.	...	.18	...	.18	...	...
Stearate	.18	.18	.18	.18	.18	.18
Oxide, cyl ....lb.	.55	.60	.55	.60	.55	.75
Ethylidenaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks ....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys,						
475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground,						
wks ....unit *l*	...	nom.	...	nom.	2.25	2.90
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis						
..................unit *m*	...	nom.	..	nom.	2.00	2.35
Fluorspar, 98%, bgs .....lb.	30.00	35.50	30.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb						
bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines						
....................ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs ....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks..lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb						
drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, chips ....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes...lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes.......lb.	.16	.18	.16	.18	.16	.18
Sticks ....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls...lb.	.45	.47	.45	.47	.42	.43
Gall Extract ....lb.	.18	.20	.18	.20	.18	.20
Gambier, com 200 lb bgs..lb.	...	.06	...	.06	.05	.08
Singapore cubes, 150 lb						
bgs ....100 lb.	.08	.09	.08	.09	.07⅛	.09⅛
Gelatin, tech, 100 lb cs .. lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, wks						
................100 lb.	1.10	1.30	1.10	1.30	1.10	1.30
Anhydrous, see Sodium Sulfate.						
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb						
bgs ....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l						
bgs ....lb.	.10½	.17½	.10½	.17½	...	...
Better grades, c-l, bgs lb.	.12	.17½	.12	.17½	...	...
Casein, kgs ....lb.	.18	.22	.18	.22	.18	.22
Glycerin, CP, 550 lb drs ..lb.	.16	.17	.16	.17	.14	.14½
Dynamite, 100 lb drs ...lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
Saponification, drs .....lb.	.10¼	.11½	.10¼	.11½	.10	.11½
Soap Lye, drs ....lb.	.09¼	.09½	.09¼	.09½	.09	.10

l + 10; *m* + 50.

Current

Glyceryl Phthalate
Gum, Yacca

	Current Market		1936		1935	
			Low	High	Low	High
Glyceryl Phthalate ....lb.	...	.28	...	.28	...	.28
Glyceryl Stearate, bbls....lb.	...	.18	...	.18	...	.18
Glycol Phthalate ....lb.	...	.29	...	.29	.28	.29
Glycol Stearate ....lb.	...	.23	...	.23	.18	.23
Graphite:						
Crystalline, 500 lb bbls ....lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls ....lb.	.03	.04	.03	.04	.03	.04

GUMS

	Current Market		1936		1935	
			Low	High	Low	High
Gum Aloes, Barbadoes ....lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ......lb.	.10¼	.10¾	.10¼	.10¾	.09½	.15
White sorts, No. 1, bgs ....lb.	.25	.27	.25	.27	.21	.27
No. 2, bgs ....lb.	.24	.26	.24	.26	.19	.26
Powd, bbls ....lb.	.13¼	.13¾	.13¼	.13¾	.13¼	.18
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY ....lb.	.02½	.10½	.02½	.10½	.02½	.10½
Egyptian, 200 lb cases, f.o.b., NY ....lb.	.12	.15	.12	.15	.12	.15
California, f.o.b., NY, drs ....ton	29.00	55.00	29.00	55.00	29.00	55.00
Benzoin Sumatra, USP, 120 lb cases ....lb.	.18	.19	.18	.19	.19	.28
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	.19½	.20	.19½	.20	.19½	.24⅝
Dark amber ....lb.	.07½	.08	.07½	.08	.07¼	.09¼
Light amber ....lb.	.13⅝	.14⅛	.13⅝	.14⅛	.11½	.14⅞
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	.13⅜	.14	.13⅜	.14	.09½	.10¾
Chips ....lb.	.06⅛	.06½	.06⅛	.06½	.05½	.06
Nubs ....lb.	...	.10⅞	...	.10⅞	...	...
Dust ....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04½
Singapore						
Bold ....lb.	.16⅜	.16⅞	.16⅜	.16⅞	.12⅛	.17
Chips ....lb.	.04¾	.05¼	.04¾	.05¼	.04⅝	.05⅝
Nubs ....lb.	.10⅜	.11¼	.10⅜	.11¼	.10	.11¾
Dust ....lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.05½
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	.12½	.13	.12½	.13	.11¾	.13
Loba B ....lb.	.11⅛	.12	.11⅛	.12	.10¼	.12
Loba C ....lb.	.10⅝	.11⅛	.10⅝	.11⅛	.10⅛	.11½
MA sorts ....lb.	.07⅛	.07⅝	.07⅛	.07⅝	.06	.07⅝
DBB ....lb.	.08⅜	.08⅞	.08⅜	.08⅞	.08	.09
Dust ....lb.	.05⅝	.06⅛	.05⅝	.06⅛	.04⅞	.06⅛
Copal Pontianak, 224 lb cases, bold genuine ....lb.	.15½	.16	.15½	.16	.14⅜	.16⅝
Mixed ....lb.	.13¼	.13¾	.13¼	.13¾	.12⅞	.14⅞
Chips ....lb.	.07	.07½	.07	.07½	.06⅞	.08¼
Nubs ....lb.	.10¼	.10½	.10¼	.10½	.09⅝	.11¾
Split ....lb.	.12⅞	.13	.12⅞	.13	.12⅜	.13⅞
Dammar Batavia, 136 lb cases						
A ....lb.	.21⅜	.21⅞	.21⅜	.21⅞	.19	.21⅞
B ....lb.	.20⅜	.20⅞	.20⅜	.20⅞	.18	.20⅞
C ....lb.	.16½	.17	.16½	.17	.16	.17
D ....lb.	.13⅝	.14⅛	.13⅝	.14⅛	.11¾	.14⅛
A/D ....lb.	.15½	.15⅝	.15½	.15⅝	.14	.16
A/E ....lb.	.13	.13¾	.13	.13¾	.11¾	.13¾
E ....lb.	.06¾	.07¼	.06¾	.07¼	.07	.07¼
F ....lb.	.06⅜	.06⅞	.06⅜	.06⅞	.06⅛	.06⅞
Singapore						
No. 1 ....lb.	.17	.17½	.17	.17½	.15⅝	.19
No. 2 ....lb.	.13¾	.14¼	.13¾	.14¼	.10⅝	.14⅞
No. 3 ....lb.	.05¼	.05¾	.05¼	.05¾	.04⅝	.05⅞
Chips ....lb.	.09¾	.09¾	.09¾	.09¾	.08⅞	.09¾
Dust ....lb.	.05⅛	.05⅝	.05⅛	.05⅝	.04¾	.05⅞
Seeds ....lb.	.06⅝	.06¾	.06⅝	.06¾	.04¾	.07¼
Ester ....lb.	.07⅝	.08⅜	.07⅝	.08⅜	.07¼	.08⅜
Elemi, cons ....lb.	.09¾	.10¼	.09¾	.10¼	...	...
Gamboge, pipe, cases .....lb.	.58	.59	.58	.59	,55	.65
Powd, bbls ....lb.	.65	.66	.65	.66	.65	.75
Ghatti, sol. bgs ....lb.	.11	.15	.11	.15	.09	.15
Karaya, powd, bbls, xxx..lb.	.24	.25	.24	.25	.23	.25
xx ....lb.	.16	.17	.16	.17	.15	.17
No. 1 ....lb.	.09½	.10	.09½	.10	.08	.10
No. 2 ....lb.	.08½	.09	.08½	.09	.07	.09
Kauri, NY, San Francisco, Brown XXX, cases ....lb.	.60	.60½	.60	.60½	.60	.60½
BX ....lb.	.33	.33½	.33	.33½	.33	.33½
B1 ....lb.	.19	.19½	.19	.19½	.19	.19½
B2 ....lb.	.14½	.15	.14½	.15	.14½	.15
B3 ....lb.	.12	.12½	.12	.12½	.12	.12½
Pale XXX ....lb.	.65	.65½	.65	.65½	.65	.65½
No. 1 ....lb.	.40	.40½	.40	.40½	.40	.40½
No. 2 ....lb.	.22	.22½	.22	.22½	.22	.22½
No. 3 ....lb.	.15	.15½	.15	.15½	.15	.15½
Kino, tins ....lb.	.70	.80	.70	.80	.70	.80
Mastic ....lb.	.60	.60½	.60	.60½	.46	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.26¼	.26½	.26¼	.26½	.26¼	.35½
Senegal, picked bgs ......lb.	.20	.21	.20	.21	.20	.21
Sorts ....lb.	.11½	.12½	.11½	.12½	.09⅜	.12½
Thus, bbls ....280 lbs.	...	11.00	...	11.00	10.50	11.00
Strained ....280 lbs.	...	11.00	...	11.00	10.50	11.00
Tragacanth, No. 1, cases ....lb.	1.20	1.25	1.20	1.25	1.15	1.30
No. 2 ....lb.	1.10	1.15	1.10	1.15	1.05	1.20
No. 3 ....lb.	.95	1.00	.95	1.00	.95	1.05
No. 4 ....lb.	.85	.90	.85	.90	.85	.95
No. 5 ....lb.	.75	.80	.75	.80	.75	.85
No. 6, bgs ....lb.	.18	.19	.18	.19	.14	.19
Sorts, bgs ....lb.	...	.25	...	.25	.11	.25
Yacca, bgs ....lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.03¾

Prices

	Current Market		1936		1935	
			Low	High	Low	High
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematite crystals, 400 lb bbls ... lb.	.16	.18	.16	.18	.16	.18
Paste, 500 bbls ... lb.	...	.11	...	.11	...	.11
Hemlock, 25%, 600 lb bbls, wks ... lb.	...	.02⅞	...	.02⅞	...	.02⅞
tks ... lb.	...	.02½	...	.02½	...	.02½
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tks ... gal.	...	.12	...	.12	...	.14
Hexamethylenetetramine, drs ... lb.	.37	.39	.37	.39	.37	.39
Hexyl Acetate, delv, drs .. lb.	.12	.12½	.12	.12½	.12	.12½
tks ... lb.	...	.11½	...	.11½	...	.11½
Hoof Meal, f.o.b. Chicago unit	...	2.50	...	2.50	2.50	2.70
Hydrogen Peroxide, 100 vol, 140 lb cbys ... lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride ... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17	.20	.17	.20	.17	.20
Indigo, Madras, bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drs ... lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid ... lb.	.13	.14	.13	.14	...	.12
Iodine, Resublimed, kgs .. lb.	1.65	1.75	1.65	1.75	...	1.90
Irish Moss, ord, bales ... lb.	:09	.10	.09	.10	.09	.10
Bleached, prime, bales .. lb.	.18	.19	.18	.19	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls .. 100 lb.	2.75	3.25	2.75	3.25	2.75	3.25
Oxide, English ... lb.	.07½	08¾	.07½	.08¾	.07½	.08¾
Isobutyl Carbinol (128-132°C) drs, wks ... lb.	.33	.34	.33	.34	.33	.34
tks, wks ... lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks ... lb.	...	.07½	...	.07½	...	.07½
drs, frt allowed ... lb.	.08½	.09	.08½	.09	.08½	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ... ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls ... lb.	...	.09½	...	.09½	...	.09½
White, broken, bbls ... lb.	...	.11	...	.11	...	.11
cryst, bbls ... lb.	...	.10½	...	.10½	...	.10½
gran, bbls ... lb.	...	.11	...	.11	...	.11
powd, bbls ... lb.	...	.11¼	...	.11¼	...	.11¼
Arsenate, East, jobbers, drs ... lb.	.09	.09⅜	.09	.09⅜	.09	.09½
Dealers, drs ... lb.	.09¼	.10¾	.09¼	.10¾	.09¼	.10¾
West, jobbers, drs ... lb.	...	.09	...	.09	...	.09
dealers, drs ... lb.	...	.10	...	.10	...	.10
Linoleate, solid, bbls ... lb.	.26	.26½	.26	.26½	.26	.26½
Metal, c-l, NY ... 100 lb.	...	4.50	...	4.50	3.50	4.50
Red, dry, 95% Pb_2O_4, delv ... lb.	.07	.08	.07	.08	.06	.08
97% Pb_2O_4, delv ... lb.	.07¼	.08¼	.07¼	.08¼	.06¼	.08¼
98% Pb_2O_4, delv ... lb.	.07½	.08½	.07½	.08½	.06½	.08½
Nitrate, 500 lb bbls, wks .. lb.	.09	.09½	.09	.09½	.10	.14
Oleate, bbls ... lb.	.15	.16	.15	.16	.15	.16
Resinate, precip, bbls ... lb.	...	.14	...	.14	...	.14
Stearate, bbls ... lb.	.22	.23	.22	.23	.22	.23
White, 500 lb bbls, wks .. lb.	.06½	.07	.06½	.07	.06½	.07
Sulfate, 500 lb bbls, wks lb.	...	.06	...	.06	...	.06
Lime, chemical quicklime, f.o.b., wks, bulk ... ton	7.00	7.25	7.00	7.25	7.00	7.25
Hydrated, f.o.b., wks .. ton	8.50	12.00	8.50	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks .. gal.	...	.11	...	.11	.10½	.11
drs ... gal.	.13	.16	.13	.16	.13	.16½
Dry, bgs, jobbers ... lb.	.07¼	.10¼	.07¼	.10¼	...	...
Linseed Meal, bgs ... ton	...	30.00	...	30.00	25.50	40.00
Litharge, coml, delv, bbls .. lb.	.06	.07	.06	.07	.05	.07
Lithopone, dom, ordinary, delv, bgs ... lb.	.04½	.04¾	.04½	.04¾	.04½	.04¾
bbls ... lb.	.04¾	.05	.04¾	.05	.04¾	.05
High strength, bgs ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ... lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Titanated, bgs ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ... lb.	.06¼	.06½	.06¼	,06½	.06¼	.06½
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.10½	.08½	.10½
Solid, 50 lb boxes ... lb.	.13½	.17½	.13½	.17½	.13½	.17½
Sticks ... ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch ... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks ... lb.	.06	.06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ... ton	36.00	39.00	36.00	39.00	36.00	39.00
Magnesium fluosilicate, crys, 400 lb bbls, wks ... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls ... lb.	...	.42	...	.42	...	.42
Heavy, 250 lb bbls .. lb.	...	.50	...	.50	...	.50
Palmitate, bbls ... lb.	.23	.24	.23	.24	.22	.24
Stearate, bbls ... lb.	.20	.22	.20	.22	.19	.22
Linoleate, !iq drs ... lb.	.18	.19	.18	.19	.18	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, bbls ... lb.	...	.12	...	.12	...	.12
Manganese Borate, 30%, 200 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ... lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ... ton	...	47.50	...	47.50	45.00	50.00
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ... ton	26.00	26.50	26.00	26.50	26.00	30.00
Marble Flour, blk ... ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride ... lb.	.81	.83	.81	.83	.71	.93
Mercury metal ... 76 lb. flasks	77.00	80.00	77.00	80.00	69.00	77.00
Meta-nitro-aniline ... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ... lb.	1.40	1.55	1.40	1.55	1.40	1.55

Current

Meta-phenylene-diamine
Orthodichlorobenzene

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Meta-phenylene-diamine 300 lb bbls . . . . .lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs . . . . .lb.	1.20	1.25	1.20	1.25	1.20	1.25
Silicofluoride, bbls . . . . .lb.	.09	.10	.09	.10	.09	.10
Stearate, bbls . . . . .lb.	.19	.20	.19	.20	.19	.20
Meta-toluene-diamine, 300 lb bbls . . . . .lb.	.67	.69	.67	.69	.67	.69
Methanol, 95%, frt allowed, drs . . . . .gal. *o*	.37½	.58	.37½	.58	.37½	.58
tks, frt allowed . . . .gal. *o*	.33	.36½	.33	.36½	.33	.36½
97% frt allowed, drs gal. *o*	.38½	.59	.38½	.59	.38½	.59
tks, frt allowed . . . .gal. *o*	.34	.37½	.34	.37½	.34	.37½
Pure, frt allowed, drs gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed . . . .gal. *o*	.35½	.39	.35½	.39	.35½	.39
Synthetic, frt allowed, drs . . . . .gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed . . . .gal. *o*	.35½	.39	.35½	.39	.35½	.39
Methyl Acetate, dom, 98-100%, drs . . . . .lb.	.18	.18½	.18	.18½	.18	.18½
Synthetic, 410 lb drs . . .lb.	.16	.17	.16	.17	.16	.17
tks . . . . .lb..	. . .	.15	. . .	.15	. . .	.15
Acetone, frt allowed, drs . . . . .gal. *p*	.49½	.68½	.49½	.68½	.49½	.73½
tks, frt allowed, drs gal. *p*	.44	. . .	.44	. . .	.44	.52½
Synthetic, frt allowed, east of Rocky M., drs gal. *p*	.57½	.60	.57½	.60	.57½	.60
tks, frt allowed . . . .gal.	. . .	.53	. . .	.53	. . .	.53
West of Rocky M., frt allowed, drs . . . .gal. *p*	.60	.63	.60	.63	.60	.63
tks, frt allowed . .gal. *p*	. . .	.56	. . .	.56	. . .	.56
Hexyl Ketone, pure, drs lb.	. . .	.60	. . .	.60	. . .	.60
Anthraquinone . . . . .lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks . . . . . .lb.	. . .	.10½	. . .	.10½	. . .	.10½
Chloride, 90 lb cyl . . . . .lb.	. . .	.45	. . .	.45	. . .	.45
Ethyl Ketone, tks . . . . . .lb.	. . .	.07½	. . .	.07½	. . .	.07½
Propyl carbinol, drs . . . .lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks . .lb.	35.00	. . .	35.00	. . .	35.00	. . .
Michler's Ketone, kgs . . . .lb.	. . .	2.50	. . .	2.50	. . .	2.50
Molasses, blackstrap, tks, f.o.b. NY . . . . .gal.	.08	.08¼	.08	.08¼	.07¾	.08¼
Monoamylamine, drs, wks lb.	. . .	1.00	. . .	1.00	. . .	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	. . .	.30	. . .	.30	. . .	. . .
Monomethylparaminosulfate, 100 lb drs . . . . .lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls. .lb.	. . .	.04¼	. . .	.04¼	. . .	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs . . . . .ton	23.00	24.00	23.00	24.00	23.50	27.00
J2 bgs . . . . .ton	. . .	14.50	. . .	14.50	15.00	15.75
R2 bgs . . . . .ton	. . .	14.00	. . .	14.00	16.00	16.50
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks . . . . .gal.	. . .	.31	. . .	.31	.26	.30
drs, c-l . . . . .gal.	. . .	.36	. . .	.36	.31	.35
Naphthalene, dom, crude, bgs, wks . . . . .lb.	3.50	3.55	3.50	3.55	1.65	3.00
Imported, cif, bgs . . . .lb.	. . .	. . .	. . .	. . .	1.90	3.00
Dyestuffs, bgs, bbls, Eastern wks . . . . .lb.	.06	.07	.06	.07	.04¼	.07
Balls, flakes, pks . . . . . .lb.	. . .	.07¼	. . .	.07¼	. . .	. . .
Balls, ref'd, bbls, Eastern wks . . . . .lb.	. . .	.06¾	. . .	.06¾	.04½	.06¾
Flakes, ref'd, bbls, Eastern wks . . . . .lb.	. . .	.06¾	. . .	.06¾	.04½	.06¾
Dyestuffs, bgs, bbls, Mid-West wks . . . . .lb. *q*	.06½	.07½	.06½	.07½	.04¾	.07½
Balls, ref'd, bbls, Mid-West wks . . . . .lb. *q*	. . .	.07¼	. . .	.07¼	.05	.07½
Flakes, ref'd, bbls, Mid-West wks . . . . .lb. *q*	. . .	.07¼	. . .	.07¼	.05	.07¼
Nickel Carbonate, bbls. . . .lb.	. . .	.36	. . .	.36	.35	.36
Chloride, bbls . . . . .lb.	.18	.19	.18	.19	.18	.19
Oxide, 100 lb kgs, NY . .lb	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY . . .lb.	.13	.13½	.13	.13½	.12½	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.11½	.13½
Metal ingot . . . . .lb.	. . .	.35	. . .	.35	. . .	.35
Nicotine, free 50%, 8 lb tins, cases . . . . .lb.	8.25	10.15	8.25	10.15	8.25	10.15
Sulfate, 55 lb drs . . . . . .lb.	.75	1.17	.75	1.17	.67	.80
Nitre Cake, blk . . . . .ton	12.00	14.00	12.00	14.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks . . . . .lb.	.09	.11	.09	.11	.09	.11
tks . . . . .lb.	. . .	.08½	. . .	.08½	. . .	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.29½	.34	.29½	.34	.27	.34
Nitrogenous Mat'l, bgs, imp unit	. . .	2.25	. . .	2.25	2.20	2.75
dom, Eastern wks . . . .unit	. . .	2.25	. . .	2.25	2.20	2.40
dom, Western wks . . . .unit	. . .	1.90	. . .	1.90	1.90	2.30
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bgs . . . . .lb.	.16	.18	.16	.18	.12	.18
Chinese, bgs . . . . .lb.	.19	.20	.19	.20	.19	.20
Oak Bark Extract, 25%, bbls lb.	. . .	.03½	. . .	.03½	. . .	.03½
tks . . . . .lb.	. . .	.02¾	. . .	.02¾	. . .	.02¾
Octyl Acetate, tks, wks . . .lb.	. . .	.15	. . .	.15	. . .	. . .
Orange-Mineral, 1100 lb cks NY . . . . .lb.	.10	.10½	.10	.10½	.09¼	.10½
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.84	.82	.84	.82	.84
Orthochlorophenol, drs . . . .lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drs . . . . .lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb drs . . . . .lb.	.05½	.06	.05½	.06	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

Prices

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ....lb.	.07	.10	.07	.10	.05½	.10
Orthonitrophenol, 350 lb drs ....lb.	.52	.80	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l ....lb.	.14½	.15	.14½	.15	.14½	.15
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, cryst .....lb.	.17	.25	.17	.25	.17	.25
51 deg liquid ....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Powd, 100 lb bgs ......lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, rfd, 200 lb cs slabs						
122-127 deg M P ......lb.	.0445	.04½	.0445	.04½	.04	.04¾
128-132 deg M P ......lb.	.04¾	.049	.04¾	.049	.05	.0515
133-137 deg M P ......lb.	.05½	.05¾	.05½	.05¾	.0575	.06
Para aldehyde, 110-55 gal drs ....lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ......lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drs ..lb.	...	...	...	...	...	...
Cymene, refd, 110 gal dr ....gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks ....lb.	.16	.20	.16	.20	.16	.20
Formaldehyde, bbls, wks lb.	.38	.39	.38	.39	.38	.39
Nitroacetanilid, 300 lb bbls ....lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	.47	.51	.47	.51	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.36	.37	.36	.37	.35	.37
Phenylenedamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs ....lb.	.32	.50	.32	.50	.32	.50
Toluenesulfonamide, 175 lb bbls ....lb.	.70	.75	.70	.75	.70	.75
tks, wks ....lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	.58	.60	.58	.60	.56	.60
Paris Green, Arsenic Basis						
100 lb kgs ....lb.	...	.24	...	.24	...	.24
250 lb kgs ....lb.	...	.22	...	.22	...	.22
Perchlorethylene, 50 gal drs ....lb.	...	.15	...	.15	...	.15
Persian Berry Ext, bbls ..lb.	.55	Nom.	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3, tks.........gal.	...	.09	...	.09	...	.09
drs, group 3 ....gal.	.10	.15	.10	.15	.10	.15
Petrolatum, dark amber, bbls ....lb.	.02⅝	.02⅞	.02⅝	.02⅞	.02	.02⅞
Light, bbls ....lb.	.03⅛	.03⅜	.03⅛	.03⅜	.02½	.03⅜
Medium, bbls ....lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02¼	.03⅛
Dark green, bbls ....lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
White, lily, bbls ....lb.	.06	.06¼	.06	.06¼	.05¼	.06½
White, snow, bbls ......lb.	.07	.07¼	.07	.07¼	.06¼	.07½
Red, bbls ....lb.	.02⅝	.02⅛	.02⅝	.02⅛	.02¼	.02⅞
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.13	...	.13	...	.13
drs, group 3 ....gal.	.15	.16	.15	.16	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ....gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Bayonne, tks, wks ..gal.	...	.09	...	.09	...	.09
West Coast, tks ....gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ....gal.	...	.16	...	.16	.15	.17½
No. 2, tks ....gal.	...	.18	...	.18	.18	.22½
No. 3, tks ....gal.	...	.15	...	.15	.15	.17½
No. 4, tks ....gal.	...	.18	...	.18	.18	.22½
Lacquer diluents, tks						
Bayonne ....gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ....gal.	.08⅜	.08½	.08⅜	.08½	.07⅞	.08
Naphtha, V.M.P., East, tks, wks ....gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ...gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Petroleum thinner, East, tks, wks ....gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ...gal.	.06⅜	.06⅝	.06⅜	.06⅝	.05⅞	.06¼
Rubber Solvents, stand grd, East, tks, wks ......gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ..gal.	.07⅜	.07½	.07⅜	.07½	.06⅞	.07¼
Stoddard Solvent, East, tks, wks ....gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ...gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Phenol, 250-100 lb drs ....lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .....lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins ..lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ....lb.	20.00	22.00	20.00	22.00	20.00	22.00

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ....ton	...	1.85	...	1.85	1.85	3.40
70% basis ....ton	...	2.35	...	2.35	2.35	3.90
72% basis ....ton	...	2.85	...	2.85	2.85	4.40
75-74% basis ....ton	...	3.85	...	3.85	3.85	5.40
75% basis ....ton	...	4.35	...	4.35	4.35	5.50
Tennessee, 72% basis ..ton	...	4.50	...	4.50	4.50	4.75
Phosphorous Oxychloride 175 lb cyl ....lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ......lb.	.44	.45	.44	.45	.44	.45
Yellow, 110 lb cs, wks..lb.	.28	.33	.28	.33	.28	.33
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ....lb.	.16	.20	.16	.20	.16	.20
Phthalic Anhydride, 100 lb drs, wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.44	.46	.44	.46	.44	.50
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks ....gal.	...	.59	...	.59	...	.59
Straw color, bbls ......gal.	...	.59	...	.59	...	.59
tks ....gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks ....ton	...	15.00	...	15.00	15.00	20.00
Burgundy, dom, bbls, wks ....lb.	...	.03½	...	.03½	...	.03½
Imported ....lb.	.11	.13	.11	.13	.11	.13
Coaltar, bbls, wks .....ton	...	19.00	...	19.00	...	19.00
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	4.00	4.50	4.00	4.50	3.75	4.25
Stearin, drs ....lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, refd ....oz.	34.50	38.00	34.50	38.00	35.00	38.00

POTASH

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Potash Salts, Rough Kainit 14% basis ....ton	...	8.50	...	8.50	...	8.50
Manure Salts, imported						
20% basis, blk ....ton	...	11.00	...	11.00	8.60	11.00
30% basis, blk ....ton	...	14.40	...	14.40	12.90	14.40
Domestic, cif ports, blk unit	...	.43	...	.43	...	.43
Potassium Acetate ....lb.	.26	.28	.26	.28	.26	.28
Potassium Muriate, 80% basis bgs ....ton	...	22.50	...	22.50	22.00	22.50
Dom, blk ....unit	...	.45	...	.45	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	22.25	22.50	22.25	22.50	19.50	22.50
Potassium Sulfate, 90% basis bgs ....ton	...	33.75	...	33.75	33.75	35.00
Potassium Bicarbonate, USP 320 lb bbls ....lb.	.09	.18	.09	.18	.07½	.09
Bichromate Crystals, 725 lb cks ....lb.	.08½	.09	.08½	.09	.08⅛	.09
Binoxalate, 300 lb bbls..lb.	...	.23	...	.23	.22	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.35	.36
Carbonate, 80-85% calc 800 lb cks ....lb.	.07¼	.07½	.07¼	.07½	.07½	.07⅞
liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	...
drs, wks ....lb.	.03⅛	.03¼	.03⅛	.03¼	...	...
Chlorate crys, 112 lb kgs, wks ....lb.	.09¼	.09½	.09¼	.09½	...	.09¾
gran, kgs ....lb.	.12	.13	.12	.13	.12	.13
powd, kgs ....lb.	.08	.08¼	.08	.08¼	.08¾	.09¾
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ......lb.	...	1.25	...	1.25	1.25	1.40
Metabisulfite, 300 lb bbls lb.	...	.15	...	.15	...	.15
Oxalate, bbls ....lb.	.25	.26	.25	.26	.16	.24
Perchlorate, cks, wks ...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, 112 lb kgs lb.	.35	.38½	.35	.38½	.35	.38½
Yellow, 500 lb casks...lb.	.18	.19	.18	.19	.18	.19
Tartrate Neut, 100 lb kgs lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls ....lb.	.32	.35	.32	.35	.32	.35
Propane, group 3, tks ....lb.	...	.03	...	.03	...	.07
Pumice Stone, lump bgs ..lb.	.04½	.06	.04½	.06	.04½	.06
250 lb bbls ....lb.	.05	.07	.05	.07	.05	.07
Powd, 350 lb bgs ......lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs .... 100 lb.	...	2.75	...	2.75	...	2.75
Linseed Oil, kgs ... 100 lb.	...	4.50	...	4.50	...	4.50
Pyridine, 50 gal drs .....gal.	...	1.30	...	1.30	1.20	1.30
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins ....lb.	2.40	2.75	2.40	2.75	2.40	3.00
Quebracho, 35% liq tks ...lb.	...	.02⅝	...	.02⅝	...	.02⅝
450 lb bbls, c-l ....lb.	...	.03⅛	...	.03⅛	...	.03⅛
Solid, 63%, 100 lb bales cif ....lb.	...	.03⅝	...	.03⅝	...	.03⅝
Clarified, 64%, bales..lb.	...	.03⅞	...	.03⅞	...	.03⅞
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.06	.06½	.06	.06½	.06	.06½
Solid, 100 lb boxes .....lb.	.10	.12	.10	.12	.10	.12
R Salt, 250 lb bbls, wks ..lb.	.52	.57	.52	.57	.44	.45
Resorcinol tech, cans .....lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ......lb.	.14	.14½	.14	.14½	.14	.15
Powd, bbls ....lb.	.13	.13½	.13	.13½	.13	.13½
Rosin Oil, bbls, first run gal.	.41	.42	.41	.42	.36	.45
Second run ....gal.	.47	.50	.47	.50	.43	.48
Third run, drs ....gal.	.54	.56	.54	.56	.50	.60

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	4.65	...	4.65	4.65	5.65
D	...	4.95	...	4.95	5.02½	5.75
E	...	5.15	...	5.15	5.15	5.90
F	...	5.40	...	5.40	5.20	5.95
G	...	5.50	...	5.50	5.25	6.00
H	...	5.55	...	5.55	5.25	6.00
I	...	5.60	...	5.60	5.25	6.00
K	...	5.80	...	5.80	5.27½	6.05
M	...	5.80	...	5.80	5.35	6.10
N	...	6.00	...	6.00	5.75	6.40
WG	...	6.35	...	6.35	5.95	6.87½
WW	...	6.90	...	6.90	6.25	7.55
Rosins, Gum, Savannah (280 lb unit):						
B	...	3.40	...	3.40	3.40	4.40
D	...	3.75	...	3.75	3.70	4.50
E	...	3.90	...	3.90	3.90	4.65
F	...	4.10	...	4.10	3.95	4.70
G	...	4.20	...	4.20	4.00	4.75
H	...	4.30	...	4.30	4.00	4.75
I	...	4.40	...	4.40	4.00	4.75
K	...	4.55	...	4.55	4.02½	4.80
M	...	4.55	...	4.55	4.10	4.85
N	...	4.75	...	4.75	4.50	5.15
WG	...	5.10	...	5.10	4.70	5.60
WW	...	5.65	...	5.65	5.15	6.25
X	...	5.65	...	5.65	5.20	6.25
Rosins, Wood, wks (280 lb unit), wks, FF	...	4.25	...	4.25	4.05	6.35
I	...	4.70	...	4.70	4.30	7.00
M	...	5.10	...	5.10	4.55	7.25
N	...	5.75	...	5.75	5.00	7.75
Rosin, Wood. c-l, FF grade, NY	...	5.12	...	5.12	4.92	5.62
Rotten Stone, bgs mines..ton	...	35.00	...	35.00	23.50	35.00
Lump, imported, bbls ...lb.	.05	.07	.05	.07	.05	.07
Selected, bbls. ....lb.	.08	.10	.08	.10	.08	.10
Powdered, bbls ....lb.	.02½	.05	.02½	.05	.02½	.05
Sago Flour, 150 lb bgs ....lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.30	...	1.30	...	1.30
Salt Cake, 94-96%, c-l, wks ....ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks ......ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls ......lb.	.059	.06¼	.059	.06¼	.059	.06¼
Powd, bbls ....lb.	.069	.07⅞	.069	.07⅞	.069	.07⅞
Cryst, bbls ....lb.	.069	.08	.069	.08	.069	.08
Satin, White, 550 lb bbls..lb.	...	.01½	...	.01½	...	.01½
Shellac, Bone dry, bbls..lb. *r*	.24½	.26½	.24½	.26½	.19	.32
Garnet, bgs ....lb.	.19	.20	.19	.20	.17	.27
Superfine, bgs ....lb. *s*	.16	.18	.16	.18	.16	.28
T. N., bgs ....lb. *s*	.14	.16	.14	.16	.13	.25
Schaeffer's Salt, kgs .....lb.	.48	.50	.48	.50	.48	.50
Silver Nitrate, vials .....oz.	...	.32⅝	...	.32⅝	.36⅜	.53¾
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.23
blk ....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs ....100 lb.	...	1.20	...	1.20	...	1.20
bbls ....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs ....100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.08	...	.08	...	.08
Acetate, tech, 450 lb bbls, wks ....lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs ....lb.	...	.64	...	.64	...	.64
Antimoniate, bbls ......lb.	.13¼	.14	.13¼	.14	...	...
Arsenate, drs ....lb.	...	.10½	...	.10½	...	.10½
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks ....lb.	.06½	.07	.06½	.07	.06⅛	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol cbys, wks 100 lb.	1.95	2.10	1.95	2.10	1.95	2.10
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Chloride, tech ....ton	13.60	16.50	13.60	16.50	13.60	16.50
Cyanide, 96-98%, 100 & 250 lb drs, wks ......lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks ....lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	.18	.19	.18	.19	.18	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide ....lb.	2.00	2.05	2.00	2.05	2.00	2.40
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ....100 lb.	2.30	3.30	2.30	3.30	2.65	3.05
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.02½
Napthenate, drs ....lb.	...	.09	...	.09	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ....ton	...	24.80	...	24.80	...	24.80
100 lb bgs ....ton	...	25.50	...	25.50	...	25.50
Bulk ....ton	...	23.50	...	23.50	...	23.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

Current

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.0735	.08	.0735	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.17	.18	.17	.18	.17	.19
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.20	2.30
bgs, wks ....100 lb.	...	2.10	...	2.10	2.00	2.10
tri-sodium, tech, 325 lb bbls, wks ......100 lb.	...	2.30	...	2.30	2.30	2.70
bgs, wks ....100 lb.	...	2.10	...	2.10	2.10	2.60
Picramate, 160 lb kgs ..lb.	.67	.69	.67	.69	.67	.69
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	.102	.132	.102	.132	.102	.15
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.05¼	.05½	.05¼	.05½	.04¼	.05
Stannate, 100 lb drs ....lb.	.32½	.34	.32½	.34	.31	.38
Stearate, bbls ....lb.	.21	.26	.21	.26	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks ....100 lb. *t*	1.30	1.55	1.30	1.55	1.25	2.35
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, bbls ......lb.	.28	.47	.28	.47	.32	.42½
Tungstate, tech, crys, kgs lb.	.85	.90	.85	.90	...	.90
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls ....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls...lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs ....100 lb.	2.99	3.19	2.99	3.19	3.13	3.78
Powd, 140 lb bgs....100 lb.	3.09	3.29	3.09	3.29	3.23	3.66
Potato, 200 lb bgs......lb.	.04½	.05½	.04½	.05½	.04½	.06
Imp, bgs ....lb.	.05¾	.06	.05¾	.06	.05¾	.06½
Rice, 200 lb bbls ....lb.	...	.07¼	...	.07¼	.07¼	.08½
Wheat, thick, bgs ......lb.	...	.08¼	...	.08¼	...	.08¼
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	.45	...	.45	...	...	...
tech, bbls, wks ....lb.	.40	...	.40	...	...	...
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs ......100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks ....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.06½	.08½	.06½	.08½	.08½	.10
Multiple units, wks ....lb.	.05½	.06	.05½	.06	...	.06½
tks, wks ....lb.	.04½	.04¾	.04½	.04¾	...	.04¾
Refrigeration, cyl, wks .. lb.	.10	.13	.10	.13	...	.13
Multiple units, wks .....lb.	.07	.09¼	.07	.09¼	...	.09¼
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	53.00	54.00	53.00	54.00	50.00	65.00
dom, bgs, wks ....ton	...	35.00	...	35.00	...	35.00
Superphosphate, 16% bulk, wks ....ton	8.25	Nom.	8.25	Nom.	8.25	8.50
Run of pile ....ton	7.75	Nom.	7.75	Nom.	7.75	8.00
Talc, Crude, 100 lb bgs, NY ....ton	14.00	15.00	14.00	15.00	14.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	22.00	30.00	22.00	30.00	22.00	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	70.00	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00	80.00
Tankage Grd, NY ....unit *u*	...	2.85	...	2.85	2.35	3.00
Ungrd ....unit *u*	...	2.60	...	2.60	2.15	2.50
Fert grade, f.o.b. Chicago ....unit *u*	...	2.75	...	2.75	2.25	2.65
South American cif..unit *u*	...	3.15	...	3.15	2.45	3.15
Tapioca Flour, high grade, bgs ....lb.	.0215	.05	.0215	.05	.0215	.05
Tar Acid Oil, 15%, drs ..gal.	.22½	.23½	.22½	.23½	.21	.23½
25%, drs ....gal.	.24½	.26½	.24½	.26½	.23	.26½
Tar, pine, delv, drs .....gal.	.25	.26	.25	.26	.25	.26
tks, delv ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech ......lb.	.24¾	.25	.24¾	.25	.22¾	.25
USP, bbls ....lb.	.28	.28½	.28	.28½	.28	.28½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ....lb.	.13	.14	.13	.14	.13	.14
Tetrachlorethane, 50 gal drs lb.	.08	.08½	.08	.08½	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl..lb.	.20	.25	.20	.25	.20	.25

t Bags 15c lower; *u* + 10.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Tin, crystals, 500 lb bbls, wks ....lb.	.37	.37½	.37	.37½	.36	.39½
Metal, NY ....lb.	.48¼	.48½	.48¼	.48½	.456	.52½
Oxide, 300 lb bbls, wks lb.	.51	.53	.51	.53	.51	.58
Tetrachloride, 100 lb drs, wks ....lb.	...	.24¾	...	.24¾	.24¾	.26¾
Titanium Dioxide, 300 lb bbls ....lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Barium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Calcium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toluidine, mixed, 900 lb drs, wks ....lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls ....lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls ....lb.	...	.75	...	.75	...	.75
Toluidine, bgs ....lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.32	.36
Triamylamine, drs, wks ..lb.	...	1.25	...	1.25	...	1.25
Trichlorethylene, 50 gal drs lb.	.089	.094	.089	.094	.09½	.10
Triethanolamine, 50 gal drs wks ....lb.	.26	.30	.26	.30	.26	.38
tks, wks ....lb.	...	.25	...	.25	...	...
Tricresyl Phosphate, drs ..lb.	.19	.26	.19	.26	.21	.23
Triphenyl Guanidine .....lb.	.58	.60	.58	.60	.58	.60
Tripoli, airfloated, bgs, wks ....ton	27.50	30.00	27.50	30.00	27.50	30.00
Tungsten, Wolframite per unit	15.00	15.25	15.00	15.25	15.00	15.25
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	**.49½**	...	**.49½**	.43¾	.55½
Savannah, bbls ....gal.	...	.44½	...	.44½	.38¾	.50¼
Jacksonville, bbls ......gal.	...	.44¼	...	.44¼	.38¾	.50¼
Wood Steam dist, bbls, c-l, NY ....gal.	...	.47	...	.47	.43	.50
Urea, pure, 112 lb cases ..lb.	.15½	.17	.15½	.17	.15½	.17
Fert grade, bgs. c.i.f. ..ton						
c.i.f. S.A. points ....ton	95.00	110.00	95.00	110.00	100.00	120.00
Urea, dom, f.o.b., wks....ton	95.00	110.00	95.00	110.00	...	...
Urea Ammonia liq 55% NH_3, tks ....unit	...	.96	...	.96	...	.96
Valonia beard, 42%, tannin bgs ....ton	60.00	Nom.	60.00	Nom.	40.00	58.00
Cups, 32% tannin, bgs..ton	...	Nom.	...	Nom.	26.00	49.00
Mixture, bark, bgs .....ton	...	Nom.	...	Nom.	...	32.00
Vanilin, ex eugenol, 100 lb tins ....lb.	...	3.75	...	3.75	...	...
Ex-guaiacol ....lb.	...	3.65	...	3.65	...	...
Vermillion, English, kgs ..lb.	1.58	1.71	1.58	1.71	1.48	1.71
Vinyl Chloride, 16 lb cyl ..lb.	...	1.00	...	1.00	...	1.00
Wattle Bark, bgs ....ton	27.50	29.75	27.50	29.75	29.00	32.00
Extract, 60°, tks, bbls ..lb.	...	.03⅝	...	.03⅝	...	.03¾

WAXES

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Wax, Bayberry, bgs ......lb.	.17½	.20	.17½	.20	.17½	.23
Bees, bleached, white 500 lb slabs, cases ....lb.	.34	.35	.34	.35	.33½	.34
Yellow, African, bgs..lb.	.24	.25	.24	.25	.21	.25½
Brazilian, bgs .....lb.	.25	.27½	.25	.27½	.21½	.26½
Chilean, bgs ....lb.	.25	.27½	.25	.27½	.21½	.26½
Refined, 500 lb slabs, cases ....lb.	.28	.30	.28	.30	.27½	.28
Candelilla, bgs ....lb.	.16	.17½	.16	.17½	.10	.17½
Carnauba, No. 1, yellow, bgs ....lb.	.46	.48	.46	.48	.35	.54
No. 2, yellow, bgs ....lb.	.45	.46	.45	.46	.34	.51
No. 2, N. C., bgs ....lb.	.40	.41	.40	.41	.26½	.43½
No. 3, Chalky, bgs ...lb.	.36	.38	.36	.38	.21	.42½
No. 3, N. C., bgs ....lb.	.36	.41	.36	.41	.22½	.43
Ceresin, white, imp, bgs lb.	.43	.45	.43	.45	.43	.45
Yellow, bgs ....lb.	.36	.38	.36	.38	.36	.38
Domestic, bgs ....lb.	.08	.11	.08	.11	.08	.11
Japan, 224 lb cases .....lb.	.08½	.08¾	.08½	.08¾	.06	.09
Montan, crude, bgs ....lb.	.10¾	.11¾	.10¾	.11¾	.10½	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.24	.22	.24	.19	.24
Cakes, cases ....lb.	.23	.25	.23	.25	.20	.25
Whiting, prec 200 lb bgs, c-l, wks ....ton	...	15.00	...	15.00	12.00	15.00
Alba, bgs, c-l, wks ....ton	...	15.00	...	15.00	...	15.00
Gliders, bgs, c-l, wks ..ton	...	15.00	...	15.00	...	15.00
Wood Flour, c-l, bgs .....ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks ....gal.	...	.33	...	.33	.27	.33
Coml, tks, wks, frt allowed ....gal.	...	.30	...	.30	.26	.30
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY ....lb.	.09½	.11	.09½	.11	.09½	.11
Chloride fused, 600 lb drs, wks ....lb.	.04½	.05¾	.04½	.05¾	.04½	.05¾
Gran, 500 lb bbls, wks ..lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks..100 lb.	...	2.00	...	2.00	...	2.00
Cyanade, 100 lb drs ....lb.	.36	.41	.36	.41	.36	.41
Zinc Dust, 500 lb bbls, c-l, delv ....lb.	...	.0685	...	.0685	.057	.0685
Metal, high grade slabs, c-l, NY ....100 lb.	...	5.22	...	5.22	4.05	5.22½
E. St. Louis .....100 lb.	...	4.85	...	4.85	3.70	4.85
Oxide, Amer, bgs, wks..lb.	.05	.05½	.05	.05½	.05	.06¼
French, 300 lb bbls, wks ....lb.	.05½	.07	.05½	.07	.05½	.10⅞
Palmitate, bbls ....lb.	.22	.23	.22	.23	.21	.23
Perborate, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Peroxide, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Resinate, fused, dark, bbls ....lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls ....lb.	.19	.22	.19	.22	.18	.22

Current

Zinc Sulfate
Oil, Whale

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Zinc Sulfate, crys, 400 lb bbl, wks ....lb.	.028	.033	.028	.033	.028	.033
Flake, bbls ....lb.	.032	.035	.032	.035	.032	.035
Sulfide, 500 lb bbls, delv lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
bgs, delv ....lb.	.10½	.11½	.10½	.11½	.10½	.11½
Sulfocarbolate, 100 lb kgs ....lb.	.24	.25	.24	.25	.24	.25
Zirconium Oxide, Nat kgs lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs ....lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs ....lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Castor, No. 3, 400 lb bbls..lb.	.10¼	.10¾	.10¼	.10¾	.09¾	.10¾
Blown, 400 lb bbls ....lb.	.12¼	.13	.12¼	.13	.11½	.16
China Wood, bbls spot NY lb.	.14	.14½	.14	.14½	.094	.40
Tks, spot NY ....lb.	.13¾	.13⅞	.13¾	.13⅞	.088	.35
Coast, tks ....lb.	.132	.134	.132	.134	.087	.24
Coconut, edible, bbls NY..lb.	...	.10¼	...	.10¼	.04	.12
Manila, tks, NY ....lb.	...	.05	...	.05	.03¾	.06¼
Tks, Pacific Coast ....lb.	.04¾	.04⅞	.04¾	.04⅞	.03⅜	.06
Cod, Newfoundland, 50 gal bbls ....gal.	...	.40	...	.40	.34	.38
Copra, bgs, NY ....lb.	.0285	.0290	.0285	.0290	.02	.038
Corn, crude, tks, mills ....lb.	.09⅜	.09½	.09⅜	.09½	.08¾	.11
Refd, 375 lb bbls, NY ..lb.	.12¼	.12¾	.12¼	.12¾	.11½	.14
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls. NY ....lb.	.05¼	.06¾	.05¼	.06¾	.04½	.06
English, brown, bbls, NY lb.	.08¾	.10¼	.08¾	.10¼	.04¾	.06½
Greases, Yellow ....lb.	.05¼	.05½	.05¼	.05½	.05	.06¾
White, choice bbls, NY lb.	.05¾	.07¾	.05¾	.07¾	.05¼	.08½
Herring, Coast, tks ....gal.	...	Nom.	...	Nom.	.23	.33
Lard Oil, edible, prime ...lb.	...	.14½	...	.14½	.09¾	.20½
Extra, bbls ....lb.	...	.11	...	.11	.08½	.11¾
Extra, No. 1, bbls ....lb.	...	.09	...	.09	.08¼	.11
Linseed, Raw, less than 5 bbl lots ....lb.	.104	.108	.104	.108	.091	.1130
bbls, c-l, spot ....lb.	...	.10	...	.10	.083	.102
Tks ....lb.	...	.094	...	.094	.0770	.096
Menhaden, tks, Baltimore gal.	...	.36	...	.36	.25	.36
Refined, alkali, drs ....lb.	.078	.082	.078	.082	.061	.082
Tks ....lb.	...	.072	...	.072	.055	.072
Light pressed, drs ....lb.	.072	.076	.072	.076	.055	.076
Tks ....lb.	...	.066	...	.066	.049	.066
Kettle bodied, drs ....lb.	...	.096	...	.096	...	...
Neatsfoot, CT, 20° bbls, NY ....lb.	...	.16¾	...	.16¾	.16¼	.16¾
Extra, bbls, NY ....lb.	...	.09¼	...	.09¼	.08½	.11¼
Pure, bbls, NY ....lb.	...	.12¾	...	.12¾	.11¾	.13¼
Oleo, No. 1, bbls, NY ....lb.	...	.12½	...	.12½	.10¾	.14½
No. 2, bbls, NY ....lb.	...	.12	...	.12	.10	.13¾
Olive, denat, bbls, NY ...gal.	.79	.80	.79	.80	.82	.95
Edible, bbls, NY ....gal.	1.60	1.90	1.60	1.90	1.55	1.90
Foots, bbls, NY ....lb.	.08½	.08¾	.08½	.08¾	.07⅛	.10
Oticica, bbls ....lb.	.11	.11¼	.11	.11¼	.13½	.28
Palm, Kernel, bulk ....lb.	...	.04¾	...	.04¾	...	...
Niger, cks ....lb.	.04⅞	.05	.04⅞	.05	.034	.05¾
Sumatra, tks ....lb.	...	.046	...	.046	...	...
Peanut, crude, bbls, NY ..lb.	...	.09¼	...	.09¼	...	...
Tks, f.o.b. mill ....lb.	...	.09⅛	...	.09⅛	.08¾	.10¾
Refined, bbls, NY ....lb.	.12¾	.13¼	.12¾	.13¼	.12½	.14
Perilla, drs, NY ....lb.	.07⅜	.07½	.07⅜	.07½	.07¼	.10¼
Tks, Coast ....lb.	...	.068	...	.068	.068	.08½
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.086	.088	.086	.088	.07½	.09
Denatured, drs, NY ...gal.	.55	.56	.55	.56	.40	.56
Red, Distilled, bbls ....lb.	.09⅝	.10⅝	.09⅝	.10⅝	.07⅜	.10⅝
Tks ....lb.	...	.08¾	...	.08¾	.06½	.08¾
Salmon, Coast, 8000 gal tks ....gal.	...	.31	...	.31	.25	.35
Sardine, Pac Coast, tks ..gal.	.36½	.39	.36½	.39	.24½	.37½
Refined alkali, drs ....lb.	.078	.082	.078	.082	.065	.082
Tks ....lb.	...	.072	...	.072	.06	.072
Light pressed, drs ....lb.	.072	.076	.072	.076	.055	.076
Tks ....lb.	...	.066	...	.066	.049	.066
Sesame, yellow, dom ....lb.	.14	.14½	.14	.14½	.12¼	.15½
White, dos ....lb.	.14	.14½	.14	.14½	.12¾	.15½
Soy Bean, crude						
Dom, tks, f.o.b. mills ...lb.	...	.085	...	.085	.08	.10
Crude, drs, NY ....lb.	.091	.095	.091	.095	.086	.11
Refd, bbls, NY ....lb.	.096	.105	.096	.105	.091	.115
Tks ....lb.	.09	.095	.09	.095	.08	.10½
Sperm, 38° CT, bleached, bbls NY ....lb.	.099	.101	.099	.101	.099	.101
45° CT, bleached, bbls, NY ....lb.	.092	.094	.092	.094	.092	.094
Stearic Acid, double pressed dist bgs ....lb.	.10	.11	.10	.11	.10	.12¼
Double pressed saponified bgs ....lb.	.10½	.11½	.10½	.11½	.09	.12¾
Triple pressed dist bgs..lb.	.12¾	.13¾	.12¾	.13¾	.12¾	.15¼
Stearine, Oleo, bbls ....lb.	.08¾	.09	.08¾	.09	.09¼	.12½
Tallow City, extra loose ..lb.	...	.06⅝	...	.06⅝	.05⅜	.07⅜
Edible, tierces ....lb.	...	.08½	...	.08½	.07¼	.09¼
Acidless, tks, NY ....lb.	...	.08¾	...	.08¾	.07½	.10¾
Turkey Red, single, bbls ..lb.	.08	.08½	.08	.08½	.07½	.08½
Double, bbls ....lb.	.13	.13½	.13	.13½	.12½	.13½
Whale:						
Winter bleach, bbls, NY lb.	.079	.081	.079	.081	.07	.083
Refined, nat, bbls, NY ..lb.	....	.075	...	.075	.064	.081

THE CHEMICAL MARKET-PLACE

Local Suppliers

A directory of responsible manufacturers' agents and jobbers maintaining spot stocks

Index to Advertisers

"We"—Editorially Speaking

A three per cent. blend of anhydrous alcohol in the nation's motor fuel would consume 172,200,000 bushels of corn, which at 60c a bushel would cost $103,-320,000. As a matter of farm relief, that sounds reasonable enough. To produce the necessary alcohol would require an investment in additional alcohol plant capacity of $6,000,000. As a matter of practical politics, this would make each one of the 111 electoral votes in the Corn Belt states cost $1,570,000. And the motorist pays the bill.

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It seems to us a pleasant thing, and significant too, that the new president of Grasselli is affectionately known as "Uncle Edward" to members of his own organization.

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Anyone who cherishes the notion that T. S. Grasselli is about to retire simply doesn't know what the duties of a du Pont vice-president happen to be. That is one company where this honorary title means onerous work.

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We are happy to report that Fred Zinsser broke, on January third, his New Year's Resolution not to tell any more Eleanor Roosevelt stories.

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'Twas ever thus—eight out of every hundred questionnaires returned for the revision of the 1936 edition of the GUIDE BOOK fail to check the chemicals handled by the questionee; two out of a hundred check the products but fail to give the firm's name; one out of a hundred put the questionnaire in the addressed-to-us envelope and fail to affix a postage stamp—dumb, dumber, too damned smart.

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Walter L. Savell, whose "In Defense of Gases" in this issue was delivered before the Compressed Gas Manufacturers Association in New York last month, was born in San Francisco in 1890. Since 1915, his explorations and developments in the field of research have been numerous. His affiliations have been with Deloro Smelting & Refining Company up in Canada, down to Harshaw Chemical Company in Elyria, Ohio, back to Canada with Metals Chemicals, Ltd., then into the firm of Savell Sayre & Co. For a short time he was associated with National Aniline, in 1928 joining Mathieson Alkali, where he is Technical Advisor in the Sales Department. He has contributed several articles within the past year or so to the *Satevepost.*

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For NOT growing crops our Government agreed to pay farmers handsomely, and when this contract is invalidated by the Supreme Court, our Congress with commendable conscience hurries to make good these illegal payments. This same Government of ours, in time of need, borrowed money, at "less than the prevailing rates of interest," from many thrifty, patriotic citizens, and when this contract is repudiated by the Government's chief executive officer, our Congress hurries to pass a law—not to restore the illegal losses of these creditors, but to deprive them of the right to sue the Government to recover these losses. If any other Government in the world so played fast and loose with its obligations—if any municipality in the land dared try such financial tactics—if the directors of some soulless corporation so discriminated against both customers and shareholders—if any individual citizen tried to so conduct his personal affairs—no, all such similes are inadequate. Only a snivelling peddler of trinkets in an oriental bazaar can successfully practice such business morality.

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Victor's General Sales Manager, Otto Raschke, looks so much like the Postmaster General and/or the Democratic National Chairman, that wherever he goes people call him "Jim." As time goes on, he likes the likeness less and less.

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From our own "I-told-you-so-department," a quotation from an editorial printed in February, 1935: "As a nation our collective dependence upon others, our lack of courage, our irresponsibility, reaches a climax. . . . We borrow more and more with an increasingly unbalanced budget. . . . And we defend all this defeatism by belittling that 'rugged individualism' we so sorely lack."

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It is said "that a rose under any other name is just as sweet." Just as we go to press with the last form of this issue, word comes from Rohm & Haas that their new product which is included in our "New Products and Processes" section, under the name Triton B, has been changed to Tetrone B. Of course, it was too late to be corrected, and we take this opportunity of broadcasting this news.

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Prating about the wicked money changers, as F. D. R. has been of late, who was the villain who changed the dollar of 100 cents to a dollar of 59 cents?

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For the third year in succession our Subscription Department reports a net gain in paid circulation.

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The Supreme Court is certainly straining a few of the alphabets out of Uncle Sam's soup kettle.

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News head in California paper reads, "Pest Society Finds New Head." In the King's English, a new president was elected for the Southern California Association of Exterminators.

Fifteen Years Ago

From our issues of February, 1921

International Pulp & Paper incorporates a Canadian subsidiary with authorized capital of $20,000,000.

Ciba Co. increases capital from $200,000 to $1,500,000.

H. B. Rosengarten, president, Powers-Weightman-Rosengarten, passes at 84.

Colgate & Co., Jersey City, plan to establish plant near Louisville for manufacture of specialties.

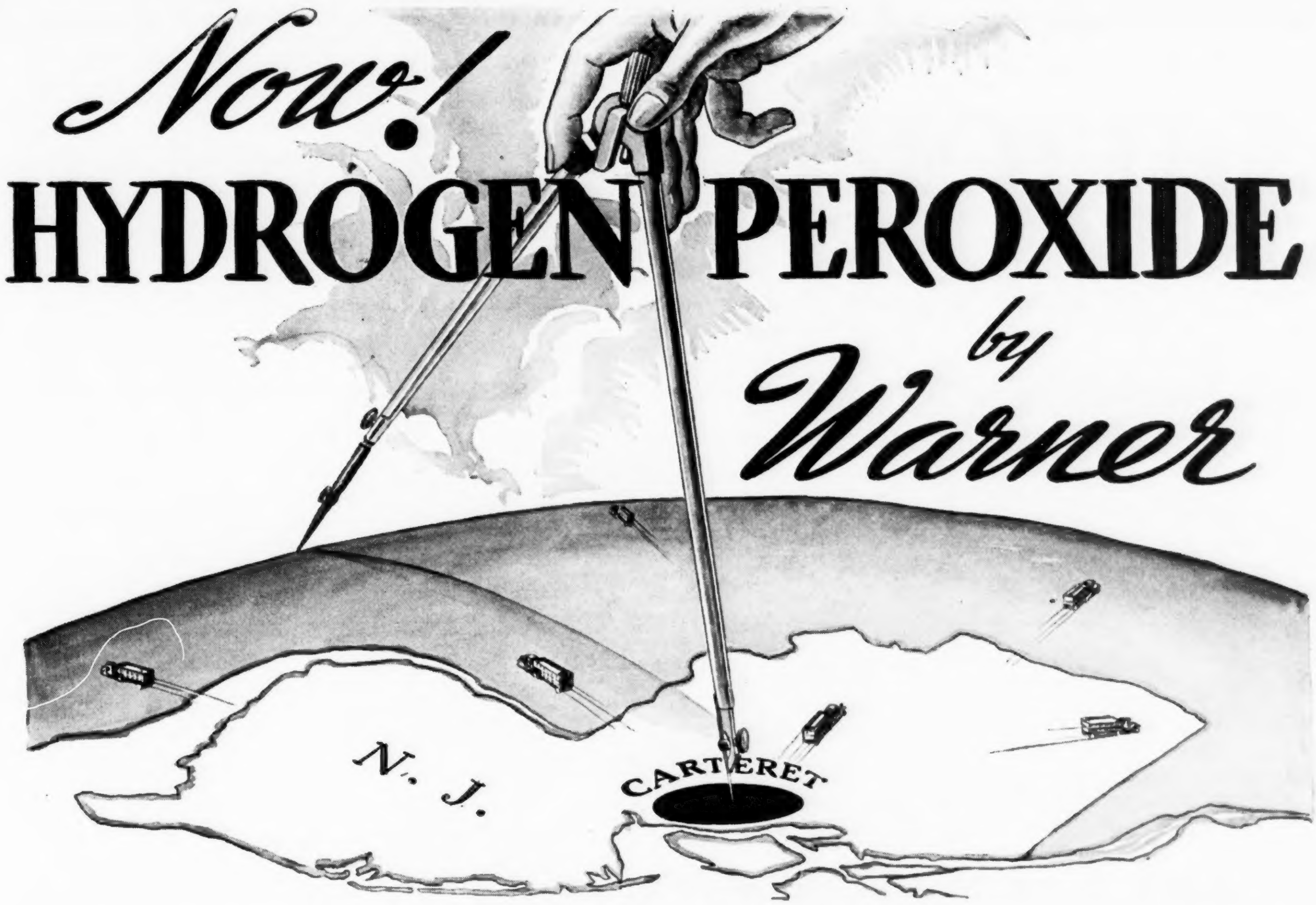
R. E. Demmon transferred from main office of Stauffer Chemical to the Houston, Tex., office, where he is general manager.

Quotation : A significant sign of improved conditions is the movement of goods from warehouses.

Solvay Securities will dissolve and distribute assets to stockholders.

Ault & Wiborg will increase capitalization of their South American branches because of new income tax laws in many countries.

Now! HYDROGEN PEROXIDE *by Warner*



We've gone modern in delivery—to save you money. As a consequence, our technical staff is ready to advise and assist in the installation of specially treated wooden storage tanks and pipe lines to bleach baths.

It's the efficient way.

Quick delivery by tank truck within a radius of 120 miles from Carteret, N. J.

Every step in the production of Warner Hydrogen Peroxide for all industrial and technical uses is under constant Warner control. From the ownership of the raw material sources to the delivery of the finished product, Warner carefully guards the purity, stability and uniformity at all times.

Erected only after several years of research and developement, the Warner Hydrogen Peroxide facilities at Carteret, N. J. are second to none in the country and make possible immediate delivery in carboy, barrel or tank truck within a radius of 120 miles which covers a vast section of the Middle Atlantic textile industry.

Let the Warner technical and chemical engineering staff cooperate. An inquiry will bring prompt response.

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CHEMICAL COMPANY

Pioneer Producers 1886

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